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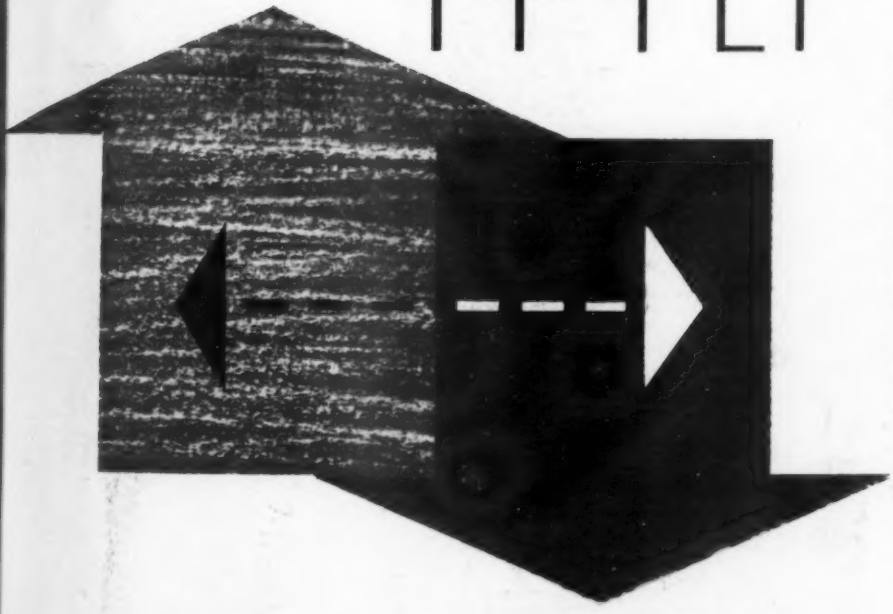

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IN ITS 76th YEAR

November 14 1959

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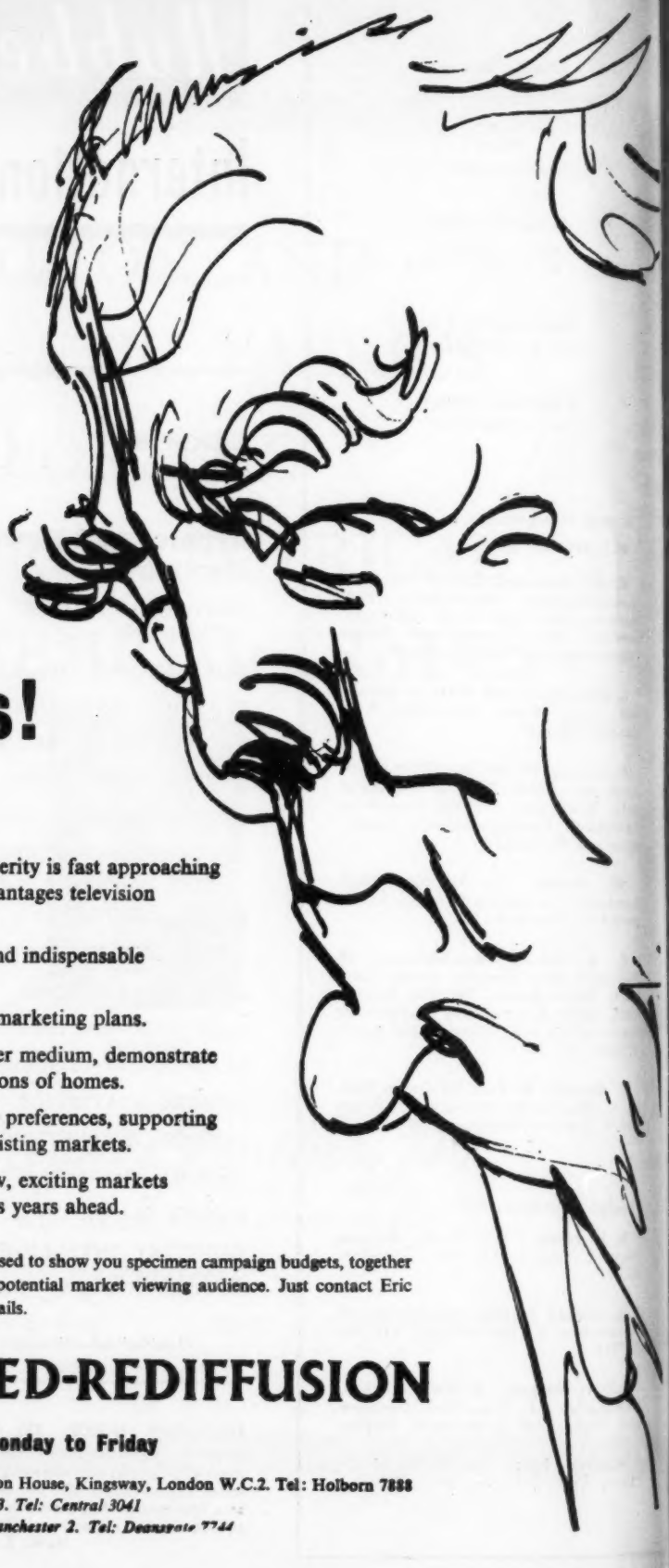

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NOTES of the WEEK

Publicity

DURING the run of the International Plastics Exhibition in Dusseldorf, many of the shops and large stores in the town featured special displays of plastics products. In some of them, entire windows were given over to domestic, mostly, plastics goods. The result was excellent publicity for the plastics industry. At about the same time, in Victoria, Australia, a 'Plastics Week' was held (October 9 to 17). Throughout the State, retail stores displayed plastics goods, emphasizing the importance of plastics in daily life. Material suppliers, manufacturers and wholesalers cooperated. Held over the same period was an inter-State competition for consumer and industrial plastics articles and a window and points of sale display competition. Backing all this was an extensive advertising campaign by poster, radio and in the press, and there were, too, competitions for old and young members of the public. The promotion was a co-operative effort by the Plastics Institute of Australia and the Plastics Industry Section of the Victorian Chamber of Manufacturers. The value of such a campaign can be judged by the fact that the 1959 'Week' was considerably wider in scope than previously. It is an idea that could well be copied.

Holiday Habits

RESENTMENT is undoubtedly growing against the inconvenience of the peak holiday period that is tied to the traditional August bank holiday. Many firms find that holiday pay costs them the equivalent of 6% of their wage bill. More and more managements are eager to find less wasteful ways in which this heavy outlay might be used, both to reduce production delays and to give employees a chance to enjoy their holidays in greater comfort. A change in holiday habits, whether it involves more extensive staggering or the moving of August bank holiday to a date later in the autumn, concerns employers, trade unions and educationists. Before such a change could be brought about, an enormous number of aspects would have to be considered. It will therefore be interesting to note results of a one-day conference to be held in London next month by the Industrial Welfare Society to consider what changes are needed in established holiday practices and how they might be achieved. The conference is to be held at the IWS headquarters, Robert Hyde House, 48 Bryanston Square, London, W.1, on December 8 and is open to non-members.

Work for the Blind

THE 75th report of the Royal National Institute for the Blind records that expenditure for the year under review exceeded £1m. The report records also that 12,000 new names are added annually to the register of blind persons in this country and the blind population is steadily increasing. The unceasing and devoted activities of the RNIB — the largest organization of its kind in the world—are many and varied, ranging from nursery schools for blind children to special homes for the elderly; from the production of Braille literature, including textbooks, newspapers and music, to 'Talking Book' long-playing gramophone records. Another of the Institute's efforts is the training of the blind for industry and commerce, possibly one of the greatest benefits that the RNIB gives, for it can mean physical and financial independence, a prize of great worth to those without sight. In this connexion, it is good to learn that there is a growing appreciation among employers that the trained blind man or woman is a first-class economic proposition. The report, a fascinating account of the work of the RNIB, can be had from 224 Great Portland Street, London, W.1.

Costing

SCIENTIFIC methods of costing have for a long time been recognized as an essential part of industrial management. Particularly is this the case with costing in the form of Standard Costs and Budgetary Control, a section of the art which makes it possible for managements to plan ahead within highly accurate forecasts of how much the products they are manufacturing will cost under certain conditions in the future. High efficiency is an absolute essential in increasingly competitive world markets. In 1954, a really invaluable aid to the achievement of this high efficiency was published by the Federation of British Rubber and Allied Manufacturers. Now a second, fully revised edition of the book has been issued. In it, definitions and methods of standard costing and budgetary control are given in a manner that makes what might be thought of as strictly an esoteric subject clear even to those who tend to be ill at ease with figures. The accountants' committee and the costing sub-committee of the Federation are to be congratulated on a very fine job. Particularly useful is the expanded chapter at the end of the book which illustrates most lucidly by means of tables and explanations the principles outlined in the book as applied to a small company. Although the book is entitled 'The Technique and Practice of Costing for the Rubber Manufacturing Industry,' the principles can be applied equally well to a business with any number of departments making a wide variety of rubber and plastics products. It is available from the Federation.

NEWS *Briefs*

CEYLON EXPORT DUTY—CARBON BLACK PLANT
ITALIAN PLASTICS PROJECT — NEW JAPANESE
SR — SUMATRA FLOODS — YUGOSLAVIA TRADE

●**Indonesia**—Reports from Djakarta state that the worst floods since 1930 have engulfed several parts of East Sumatra, including several low lying rubber estates.

●**Russia**—For the first time in the Soviet Union or in Europe, synthetic rubber will be cheaply produced directly from gas in a synthetic rubber plant in Azerbaijan for which equipment has been ordered, the Premier of Azerbaijan announced at a meeting of the Supreme Soviet in Moscow.

●**Ceylon**—The Ceylon Government has increased export duty on crepe rubber by 10 cents to 38 cents per lb., effective from November 6 (100 cents equals one rupee). The Government Gazette said that crepe rubber of every description other than scrap crepe would come under the new duty. One reason for the increase was reported to be the recent steady improvement in crepe rubber prices. The Government expected an additional revenue of five million rupees from the change in duty.

●**Yugoslavia**—Under a trade protocol just signed in Cairo between the United Arab Republic and Yugoslavia, Yugoslavia will obtain tyres manufactured in the United Arab Republic. The protocol regulates the exchange of raw materials and industrial products between the two countries for a 10 year period.

●**Japan**—The Bridge-Stone Tire Company has announced in Tokyo that it has succeeded in polymerizing a new synthetic rubber—cispolybutadiene—by its own methods. This was the first success in Japan in polymerizing synthetic rubber, it was stated. The company was filing applications for the patent rights of the new method in Japan, West Germany, France, Britain, the United States and Italy. The company said, however, it might take a few years before full-scale production of the new synthetic rubber can begin.

●**Italy**—The Societ per Azioni Plastica Italiana (Italian Plastics Company) formed by four large foreign companies, has started building a large factory at Trino Vercellese, near Vercelli, for the manufacture of plastics. The Marley Tile Co. Ltd. of London, the Fademac Societe Anonyme of Brussels, the Dalamai Societe Anonyme of Paris, and the Johns Manville Corporation of the United States have holdings in the Societa Plastica Italiana. The factory will occupy 58,000 square metres of space. Production will commence at the beginning of 1960 and will mainly be of thermo-plastic materials for the building industry, thermoplastic tiles and plastics accessories.

●**United States**—The General Tire and Rubber Company has announced the introduction of a line of tyres for use on the new compact cars. The new 13in. tubeless tyres for the compact cars are a 'fatter, shorter, lighter version' of the company's regular line of silent safety winter cleat tyres. The new tyres, Mr McQueen, vice-president, said 'can be used for either high-speed turnpike operation on dry pavement or for operation under heavy snow-slush conditions.'

●**Japan**—The Japan Zeon Co., according to a recent statement, has been producing synthetic rubber since July this year and a small quantity of this product is now on the market. According to the Japan Rubber Association, no synthetic rubber was produced in Japan last year. The statements by Zeon and the Association were made as comment on Press reports from Kuala Lumpur on October 12, quoting Mr Okuno, leader of the Japanese trade delegation, now in Malaya, as saying that Japan had produced 5,000 tons of synthetic rubber last year and would produce 20,000 tons this year. The Association said only two companies were operating in Japan—the Japan Zeon Company, backed by the US Goodrich Rubber Company, and the Japan Synthetic Rubber Company, backed by the US Goodyear Rubber Company. The Japan Synthetic Rubber Company has announced that its plants now under construction would be completed in December this year.

●**United States**—A plant to manufacture oil carbon black is to be built in Italy, it has been announced in New York. A joint statement made by Mr K. S. Adams, the Chairman of the Phillips Petroleum Company, and Mr Enrico Mattei, Chairman of the Italian ANIC (Societa per Azioni) Company, said that the two concerns were forming an Italian company which is scheduled to be in operation within two years. The company, which will be known as the Phillips Carbon Black Italiana Societa per Azioni, will produce 25m. lb. of oil blacks annually. Phillips is also constructing carbon black plants in France and South Africa in partnership with companies in those two countries.

'Oh well, I still say it was worth a try—putting the pressure up!'—458

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Synthetic Proteid Structures in Latex Compositions

AN ANALYSIS

By E. G. CURPHEY

TECHNIQUES for the synthesis of proteids and enzymes have been studied with great interest in recent years. These synthetic products are destined to find important applications in latex technology when synthetic methods have been perfected. Before discussing the possible role of these synthetic products however, it would be relevant to appreciate some of the uses found for natural enzymes in the rubber industry. Catalase, the enzyme present in yeast and haemoglobin, has been used in the production of sponge rubber. This enzyme by virtue of its ability to control the release of oxygen from hydrogen peroxide has been exploited in the manufacture of homogeneous porous products. Enzymes associated with biological breakdowns have also found important uses; thus the enzymatic removal of proteid in rubber latices has yielded rubber articles with good electrical characteristics.

The ammonium salts resulting from the hydrolysis of the proteids, unlike the products from the Kaysam process do not appreciably effect either the appearance or the properties of the resultant rubber. The coagulating properties of enzymes have also been exploited in the preparation of adhesives, particularly those used in the manufacture of rubber bags and sacks as well as those used in yarn splicing operations. In the latter technique, the tedious knotting procedure is overcome by arranging appropriate yarn ends as butt joints and then cementing them. In moulding techniques, trypsin degraded latex has been utilized satisfactorily in processes carried out at ordinary temperatures. The absence of heat in such applications eliminates the necessity for elaborate mould design and makes moulding an economic process.

Trypsin

The technique is particularly suitable for tropical conditions. Lepetit has described the use of trypsin in these applications. The process is one involving an ammoniated latex with 60% solids. A 10% dispersion of pork pancrease powder is used in quantities usually around 2% on rubber content. Gelation depends upon (1) the temperature of the surroundings and (2) the period of pre-digestion of the latex with the enzyme preparation. Lepetit for example obtained the following results with enzyme activated moulding compositions:

INFLUENCE OF DIGESTION TIME UPON HEAT SENSITIVITY AT 50°C.

Digestion in days at 18°C...	1	2	3	4	5	7	10	15	2
Coagulation time in minutes at 50°C.:									
0.1% ferment	>30	>30	>30	18	13	8	5.75	4	3.5
0.2% ferment	>30	10	4.25	3.25	2.75	2.25	2	2	1

In moulding techniques, the vulcanizing ingredients can be added some time before use, although the zinc oxide must be added just before the moulding operation starts. The oxide is used in amounts of the order of 3% of rubber content.

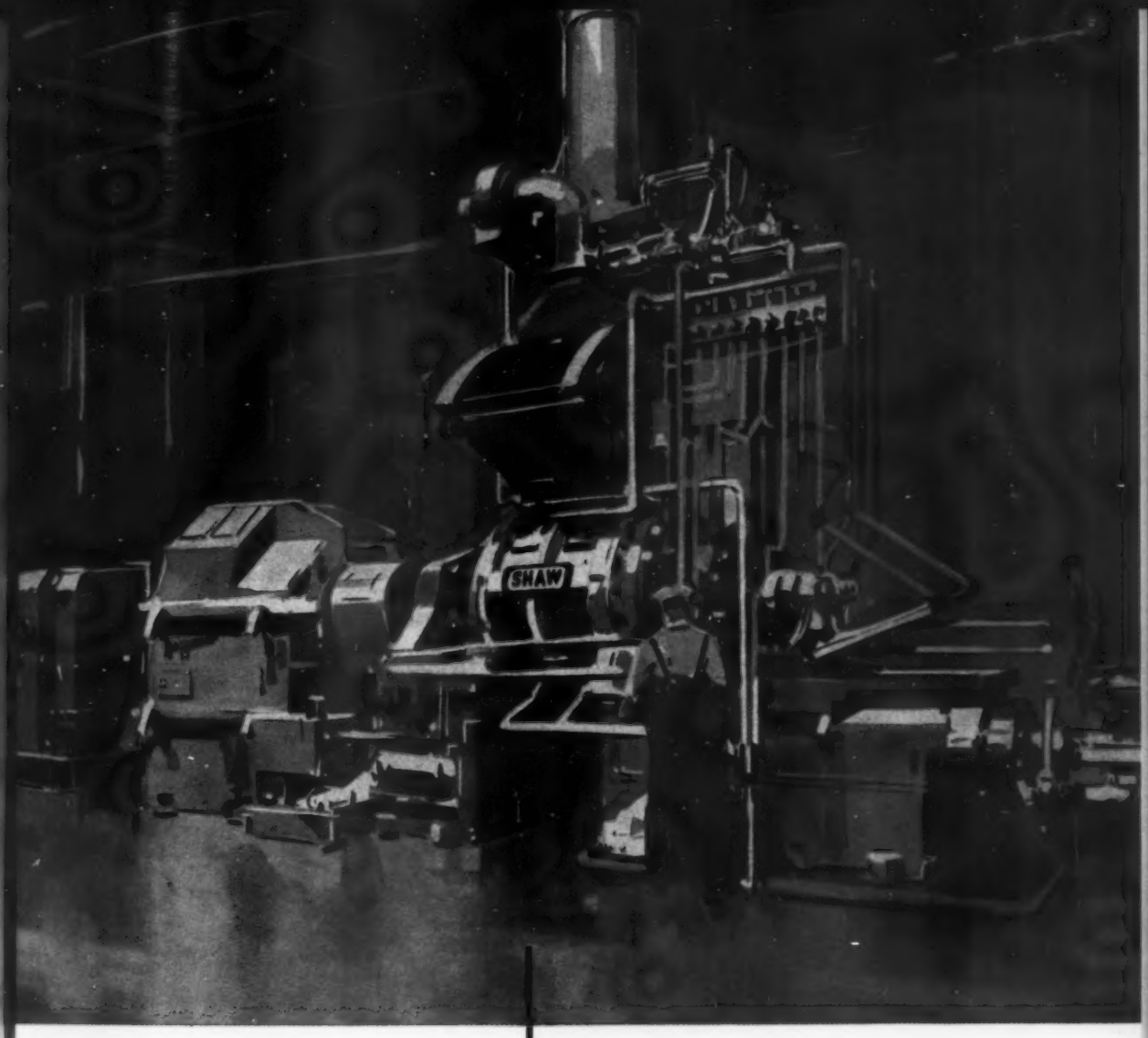
Bykova[2] has associated the action of enzymes on rubber latices with the partial hydrolysis of the proteid envelopes surrounding the rubber particles. Rubber latex itself contains enzymes such as peroxidases which are however neutralized by the reductases present[3]. The enzymes secreted by many bacteria and such rhizopods as the amoebae on the other hand contain proteases which can bring about the hydrolysis of the proteid shells. Proteolytic enzymes used in industry however are obtained from vertebrate sources. The partial hydrolysis of albumen envelopes is effected by pancreatic extracts — a technique which started around 1950[4] but modern processes are now tending to substitute these extracts for those obtained from the mycelium of moulds of the Aspergillus family. These include A.oryzae, parasiticus and alleaceus, all used in the coagulation of latex.

Nevertheless, up to the present time, trypsin has been used considerably for the biological degradation of latex largely because of its ability to function in alkaline media. It is therefore suitable for ammoniated preserved latices. Other enzymes can however coagulate latex. Papain, an enzyme obtained from the tropical plant Carica papaya, is effective in neutral solutions, while pepsin can operate at the lower pH's although it is less satisfactory than the other ferments.

Mechanisms relating to enzyme reactions which involve the degradation of proteid have never been fully elucidated; recently however, American chemists from their study of enzyme models, have postulated attractive mechanisms for enzyme-substrate systems involving hydrolysis.

Enzymes are globular conjugated proteins so called for their spherical shapes. They have extending from their axes, in common with proteins, polar molecular groups: these groups are responsible for the chemical reactivity of the enzyme. In myoglobin for example, the prosthetic groups through their iron atoms, can combine with oxygen and later release it when required by the tissues. In this way myoglobin functions as a store for oxygen in the tissues. Its presence in animal tissue accounts for the ability of some animals such as whales, penguins and seals to remain under water for long periods.

Recent theories relating to enzyme action have been proposed by workers such as Bender and Turnquest[5], Bruce and Schmir[6] and Chesbro and Hedrick[7]. The catalytic activity of hydrolytic enzymes has long been associated with the iminazole groups; thus the hydrolytic activity of acetyl cholesterinase, trypsin and a-chymotrypsin have all been connected with these heterocyclic ring systems. In their study of enzyme models, Bender and Turnquest hydrolysed p-nitrophenyl acetate by means of iminazole derivatives. The mechanism was regarded as a concerted process, involving attack of carbonyl carbon at the pyridine nitrogen in the iminazole moiety. The intermediate acyl iminazoles which were ultimately formed were unstable in aqueous solution and hydrolysed to free acid and base. Since the hydrolysis of the



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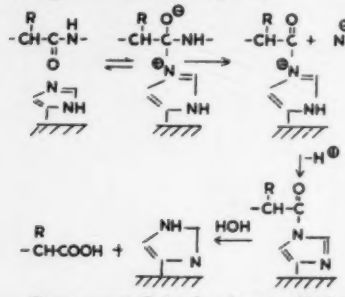
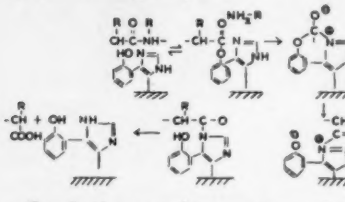
P.2806

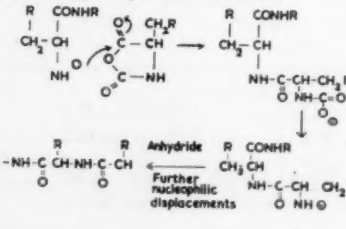
-CO-NH- group sensibly resembles the hydrolysis of esters, a conceptual basis for the biological breakdown of proteids based on the Bender and Turnquest mechanism may be represented in the equations shown below, the attachment of enzymes at the various sites in the proteid substrate being omitted for simplicity.



Bruce and Schmir also studied the hydrolysis of 4(2′-acetoxyphenyl) iminazole; this was an enzyme model having acid and basic sites. In the reaction below, the carbonyl attacks the hydroxyl to give an acyl derivative followed by quaternization of the pyridine nitrogen. The dipolar intermediate then rearranges to give after migration of a proton, an unstable acyliminazole, which then undergoes spontaneous hydrolysis.



Synthetic proteid structures have also been studied and long polypeptide structures with attached iminazole side chains comparable with the prosthetic groups present in enzymes and proteins have been synthesized. These compounds have been prepared from Leuchs' anhydride derivatives. The polymerization is ionic in nature and usually involves initiation by primary or secondary amines. The mechanism of the reaction is shown below. It is possible that in the near future proteid structures with tailor-made stabilizing characteristics may become known. Furthermore, the synthesis of 'fraudulent' proteid structures unaffected by bacterial attack could lead to the development of biologically stable latices.



The mechanical stability of latex may be assessed approximately by reference to the Huggins equation. This equation gives the free energy of dilution ΔG shown in (i).

$$\Delta G = RT \left\{ \log_e (1-V_r) + V_r(1-1/x) + V_r^2 \right\} \quad .. \quad (i)$$

V_r = volume fraction of polymer and x is the ratio of the molecular volumes of polymer and liquid respectively.

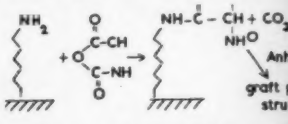
In concentrated solutions (i) sensibly becomes (ii)

$$\Delta G = RT \left\{ \log_e (1-V_r) + V_r + \mu V_r^2 \right\} \quad ..... \quad (ii)$$

The value μ is obtained from the equation involving heats of dilution ΔH and is equal to $V_o (/^e_o - /^e_r)^2$. This equation has been added to the entropy dilution equation to give the Huggins equation. When ΔG approaches zero solvation is favoured but when it shows positive values, the separation of the phases becomes evident. In systems of constant polymer fractions ΔG falls in value when $e_o = e_r$ *i.e.* when the cohesive energy densities of liquid and polymer are equal. Although this treatment is crude it gives some indication of the type of proteid structure suitable for evaluation in latex dispersions. The mechanical stability of latex may be regarded as being dependent upon competitive processes involving rubber and water for the proteid molecules. During agitation, the polar sites in the proteid molecules are increasingly attacked by water molecules. Since the difference in cohesive energy densities of proteid and water are less than that of proteid and rubber, proteid will tend to break from the rubber particles and become attached to the water molecules, this condition being conducive to instability. The synthesis of polypeptide structures, therefore, with some hydrophobic characteristics, would on the simplest of assumptions, tend to afford model rubber-stabilizer systems where the cohesive energy densities of the components approach each other. Emulsions of improved mechanical stability would then be envisaged. It is well known that soaps have a positive effect on mechanical stabilities because of the reduced number of polar sites and the increased number of methylene groups. On the other hand Fickenday noted that although the kickxia latex was stabilized by peptones, these highly polar molecules produced latices which were destabilized on dilution with water. From such observations, therefore, the synthesis of polypeptide structures from the bis polymethylene N-carboxyanhydrides may form the basis of less polar protein type analogues.

Graft proteins have also been studied by Stahman, Becker, Green, Tsuyuki[9 10 11 12] and other workers by reacting proteins in buffered solutions with α-amino acid N-carboxy anhydrides to give polypeptidyl proteins.

Konisberg and Becker modified egg albumen in this way[13]. Such a development in the technique of graft proteids now suggests the development of proteids with hydrophobic type articulations, less sensitive to bacterial attack and possessing greater stabilizing effects. In appropriate buffered solutions the grafting of N-carboxy anhydrides to the latex proteids to give improved protein stabilizers now remains a possibility. The grafting reaction appears to take place at the available amino groups in the proteid molecule[14].



Synge and later Rhinesmith[15] have shown that the valine peptides are stable to acid hydrolysis due to the steric effect of the isopropyl group, furthermore polydl-valyl chymotrypsin possesses a better resistance to hydrolysis than the parent proteid.

Konisberg and Becker obtained polypeptidyl proteins summarized in the following table:

POLYPEPTIDYL PROTEINS

Protein	Amino Grps. per Mole.	Average Chain Length
Bovine plasma Alb. ..	62	2
Egg albumen ..	62	5
Chymostrypsin ..	16	5
Pepsin	3	–
Lysozyme	6	6

Glycine-N-carboxyanhydride was used in these alkylations.

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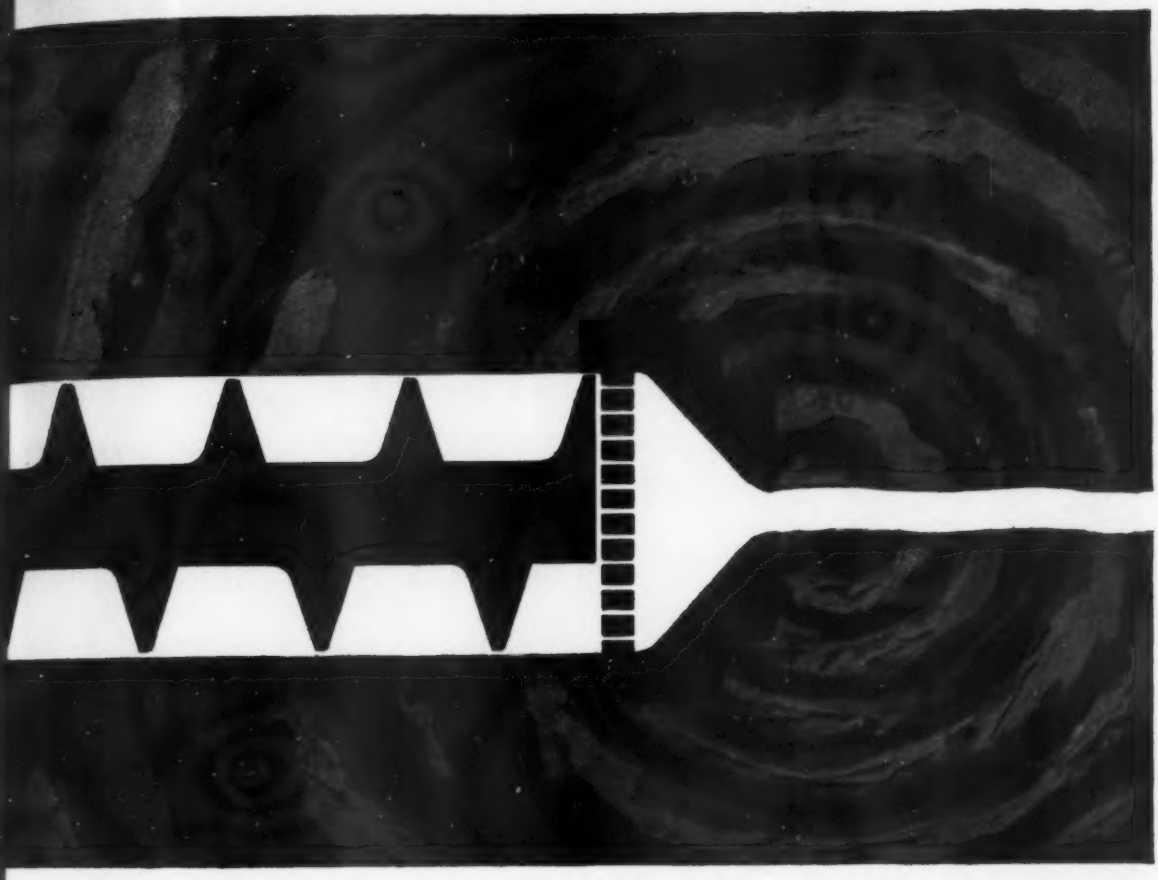

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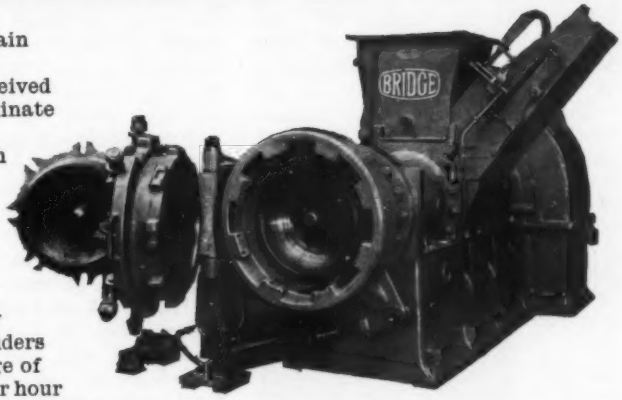

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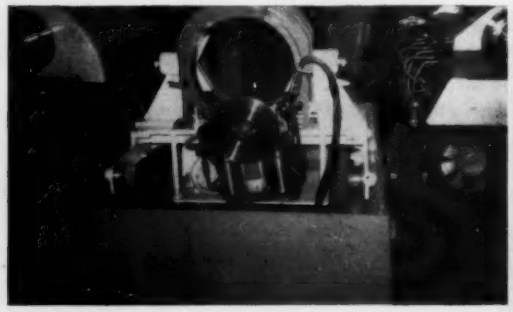
Kunststoffe 1959

SECOND REPORT ON DUSSELDORF PLASTICS EXHIBITION

IN this second report on the International Plastics Exhibition held in Düsseldorf between October 17 and 25, the items described have been selected to cover the machinery and part finished or semi-finished products sections, rather than a continuous report on one part of the Exhibition.



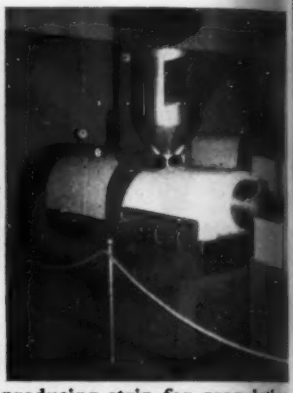


Fig. 1. a (*above*) **The new Mapre rotary travelling saw for use with large diameter extruded tube. b** (*centre*) **An interesting example of the new Mapre 64mm. twin-screw extruder producing strip for granulation. c** (*right*) **An example of the new 102mm. twin-screw extruder fitted with force-feed hopper**

Since the Mapré Company has come under the control of Swiss directors much development seems to have taken place, as was apparent at this stand where two new extruders and a new large diameter rotary travelling saw were displayed. One of the most interesting exhibits was the new swing saw device which operates on a principle whereby the saw rotates round the tube as it is extruded from the machine. The whole swing saw device travels on pulleys (Fig. 1a). Also shown was the new large extruder model E2/58/102 with twin screws of 102mm. diameter. The output of this machine for profile and tube is claimed to be between 85 and 260lb. an hour and for granules between 120 and 530lb. an hour, both of which figures are high by normal output standards in the UK. Another interesting feature of this machine is that it is driven by 17.5kW motor and the heating elements use 11kW. The machine speed is controlled by a remote control hydraulic gear box from the instrument panel which gives stepless speed variation. The screw ratio is approximately 10 to 1, the length of the barrel being 1,035mm. A mechanical force feed hopper (Fig. 1c) which is of particular use with certain types of extrusion, is incorporated. This feed hopper is also linked to the instrument panel. As an alternative to the standard model as shown, the extruder is available with a vacuum extraction device fitted to the barrel for the removal of monomer and other moisture. An interesting new feature has been incorporated in the screws. The normal bullet head end of the screw has been changed and redesigned to incorporate a spiral as a result of which it is claimed there is a considerable reduction in the tendency for burn-up to take place. The machine is fitted with a safety clutch so that if anything goes wrong at all the clutch slips and creates friction, thereby causing the whole plant to switch off.

Also on this stand was shown the new 64mm. machine which was actually operating and extruding rod for granulation, using polythene powder in the machine. The illustration (Fig. 1b) shows the actual 'spaghetti' coming out of the machine and travelling through the various cooling processes to the granulator at the end (Fig. 2). A better illustration (Fig. 3) of this process shows the fan situated near the extruder which blows cool air through the strip. On the left hand

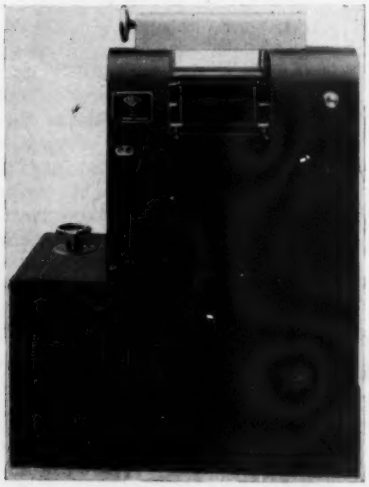


Fig. 2. A view of the Mapre PVC granulating device, showing rollers and dividing plates

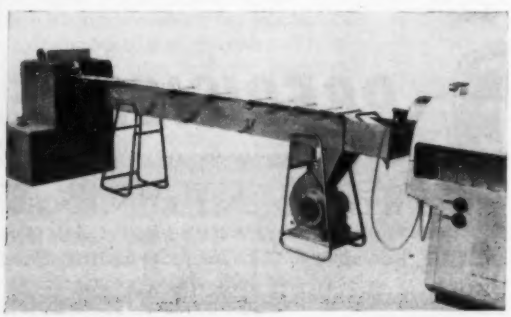
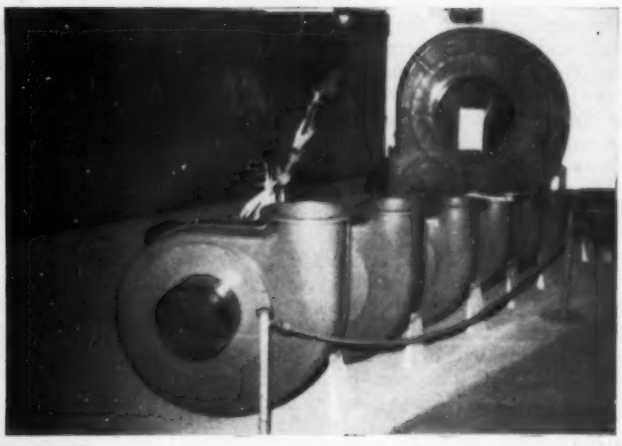


Fig. 3. A side view of the Mapre extruder, showing the granulator on the left side and the cold-air fan which cools the strip on leaving the extruder



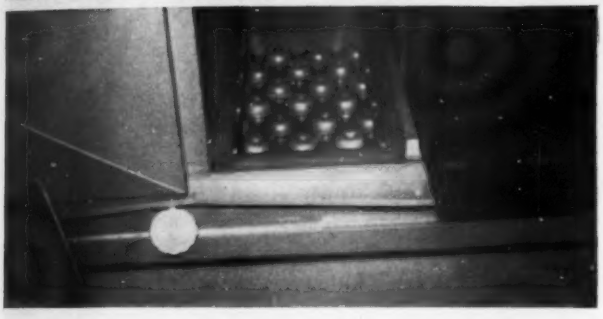


Fig. 5. a (*above left*) **Moulded high-density polythene impellers on the stand of Colasit Ltd., Switzerland. b** (*above right*) **Heat-formed welded PVC fan cases, Colasit Ltd. c** (*below*) **A close-up of the Colasit fume scrubbing unit, illustrating the method of scrubbing in use**

side of the picture can be seen the granulator which can be set to any type of granulation and size of granule which is required. The details of the new small machine are as follows: The Model No. is E2/58/64 and the diameter of the twin screws is 64mm. The output on profile and tube, etc., is between 35 and 170lb. an hour and for granulation between 42 and 220lb. per hour. The main motor is 10.7kW and 7kW of heat are used in the barrel. The length of the barrel is 640mm. therefore giving a screw ratio of 10 to 1. The speed is controlled by two optional alternative systems. The first by means of a commutator motor and the second by the use of a hydraulic gear box, in both cases the speed control is from the instrument panel. The separate illustration of the granulator shows quite clearly (Fig. 2) how the small strip is fed through the rollers into the granulator which is controlled by the handle on the left for speed and by the handle on the top for granule size.

Interesting on the Engelhardt stand was a pelleting machine (Fig. 4) which makes up pellets to the exact dimensions and sizes required, a feature particularly important where very intricate sections are being either moulded or extruded. This machine will have special applications with some of the newer plastics materials coming along. On this same stand were exhibited the precision weighing feeders to be mounted to any injection moulding machine. These instruments operate on a tolerance of ± 0.3% and are able to carry out 15 weighings per minute. The value of this equipment is principally in the production of high quality injection moulded parts, as with the pelletting machine, where exact dosages are important in order to eliminate either shrinking or the formation of burrs. Due to this accurate control of the feeding, obviously, the life of the machine and the tool are increased appreciably.

From the plastics engineering and fabricating side, there was much to see at various stands, considerable emphasis was given to the range and size of polythene fans that can be

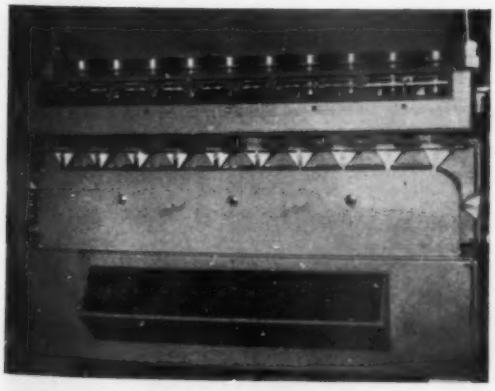


Fig. 4. The Engelhardt pelleting machine which will make pellets up to the exact dimensions and sizes required

Fig. 6. PVC ¾in. valves installed in standard pipe-line system on the stand of Technische George Fischer

produced. As at the recent Paris Exhibition, it was interesting to note the stage of development that has been reached with impellers, which at the moment seems ahead from a commercial point of view to what is being done in the United Kingdom.

For example, on the stand of Colasit Ltd. of Switzerland, was a very interesting display of moulded high density polythene impellers (Fig. 5a). These are being moulded up to 12in. diameter and must obviously cut down fabrication time considerably, apart from which the need for balancing of the impeller is cut out certainly in these dimensions. Also on the same stand was a range of PVC fan cases which had been heat formed and welded down the centre of the casing. From the illustration (Fig. 5b), it can be seen that a very clean looking line is a result of this technique and must obviously improve the flow characteristics of the unit. In the case of the smaller PVC fan cases they are operated with the moulded high density polythene impellers, from which it can be assumed that the end user unit price must be lower than the equivalent unit in the UK. Another interesting feature of these fans is that the front casing is bolted on afterwards and can be made according to the diameter of the ducting to be used. In the background of this illustration can be seen a very large patented scrubbing and washing unit incorporating a special neutralizing device. The workmanship on this was excellent and from conversations with an official on the stand it is believed that a considerable number of these type of units are in use on the Continent as standard equipment. In the second illustration (Fig. 5c) of this scrubbing unit the polythene coke tray has been renewed. The bubble caps through which fume comes after the first wash can be seen. Fume then goes through coke beds—which are in turn sprayed with jets—to a second bed where the final scrub takes place before the fume passes through the baffle plates to atmosphere. The whole equipment operates with a very high degree of efficiency. Other than the patented neutralizing device the basic principle of the scrubber is the same as in the UK although the design is completely different.

Technische George Fischer showed batteries of their PVC valves in various circuits as illustrated (Fig. 6) where ¾in. bore valves are shown in operation in a circuit. These valves range from ¾in. to 2½in. bore which cover most normal requirements. Also Fischer make under licence the Saunders patent diaphragm valve which has a big outlet in Germany and elsewhere on the Continent.

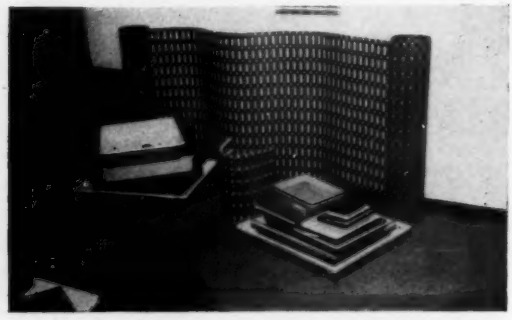


Fig. 7. An illustration of rigid-PVC vacuum-formed trays and (in the background) a PVC mat made of both rigid and flexible extruded strip for use in chemical and plating plant. Schrupp and Co.

Schrupp and Co. exhibited much of interest including a wide variety of vacuum formed trays in PVC and polythene, using in the case of PVC two colour material which has a very attractive appearance. For example, the square tray on the left of the illustration (Fig. 7) is white inside and red outside and is chemically ideal for laboratory and photographic work. As also shown in the illustration the floor matting is very good; this is made of rigid PVC vertical strip and flexible PVC horizontal extruded strip, the mat being available in continuous lengths as required. This fibre matting must obviously have a very big application in plating departments and other sections of industry where corrosion is a severe problem.

At the Rohm and Haas stand there was much of interest to be seen in the use of Plexiglass where the properties of transparency are of particular value in the wide range of applications. The number of different types of products that can be made from this material, as well as the thickness of plate that is available for machining and other processes, is illustrated in Fig. 8. Plexiglass is widely used on the Continent. In the Atomium, in Brussels, for example, the windows in the spheres were all made from this material which is also used widely for advertising signs, etc. Apart from this, however, Plexiglass or some of its associated materials such as plexigum can be used for other purposes such as the construction of fruit juice filling machines and as insulators to cover power breakers. The material is suitable for drilling and machining although different techniques must be used. Another perhaps less important but interesting application for Plexigum is for the permanent preservation of insects and other items which can be completely imbedded in a block which is then polished and gives a perfect reproduction of the item imbedded.

From the plastics engineers' point of view there was a most interesting sample of a 20in. diameter, ¼in. walled, rigid unplasticized PVC extruded tube. This was of excellent

Fig. 8. A wide variety of different products can be made from Plexiglass, manufactured by Rohm and Haas. Properties of transparency are of particular value for many applications

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quality from the extrusion point of view and dimensionally was also good. The tube was shown on the stand of Societa Del Gres Ing. Sala and Co. of Milan, who extrude large quantities of rigid PVC pipe. As a matter of technical interest the 20in. diameter tube was extruded on a Pasqueti machine.

On the stand of Kabelwerke Jacob there were some fine examples of the extrusion of complicated section, but of particular note was the number of samples of extrusions in two colours, the differential being maintained accurately between these two colours. From discussions with a representative of this company it appears that a big outlet for this two colour extrusion is in the domestic field where eye appeal is important.

The use of polyamides for technical applications seem fairly widespread and in particular where strength is important. On the stand of Farbwerke Schroeder and Stadelmann was shown rail connexion plates for bolting railway lines together made entirely from polyamide.

A further report of the Exhibition will be given in next week's issue of *RJIP*.

Ekco Plastics Ltd. announce new colours for the Ekco 'Gold Seal' measuring jug and colander, both of which will in future be available in a choice of red, blue, green or yellow. With the recent introduction of the child's mug and plate, the Ekco feeding bowl is being discontinued, as are also the small flower holder and the gardening basket.

PI London Section

ANNUAL LUNCHEON

THE annual luncheon of the London and District Section of the Plastics Institute was held in London at the Criterion on November 5. Over 270 members and their guests attended.

In welcoming members and guests, Dr J. Gadsby, chairman of the London Section, said that they were very glad to have with them the president of the Plastics Institute, Mr H. F. Wilson; the chairman of council, Dr G. Tolley, and the president of the British Plastics Federation, Mr C. H. Glassey. They were also fortunate in having several ex-chairmen of the London Section and the chairmen of a number of other sections of the Institute.

After the luncheon, and before the main speech, certificates of Fellowship of the Plastics Institute were handed to Mr H. White and Mr L. M. Phillips by the president. In making the presentation, Mr Wilson said that the Fellowship was the highest award of the Institute. It was appropriate that certificates should be presented at important occasions.

In an amusing speech, mentioning that physical properties were studied by both the Institute and the publication represented by the next speaker, Dr Gadsby then introduced the guest speaker for the occasion, Mr George H. Fuller, circulation manager of *Week End*. Mr Fuller spoke of similarities and dissimilarities between his organization and the plastics industry, and other things.

Dr F. P. Hiron, vice-chairman of the London Section, spoke briefly and entertainingly in proposing a vote of thanks.

Amongst those present at the luncheon were: 1—*Left to right*, G. H. Fellow, P. S. Adamson (Chairman, Plastics and Polymer Group, Society of Chemical Industry), C. H. Glassey (President, British Plastics Federation), Dr. J. Gadsby (Chairman, London Section Plastics Institute), E. G. Williams (Joint Managing Director, I.C.I. Plastics Division), H. F. Wilson (President, Plastics Institute), C. W. Oakhill (Hon. Sec., London Section, Plastics Institute), Dr. G. Tolley (Chairman of Council, Plastics Institute). 2—Mr. C. W. Oakhill, Dr. F. P. Hiron (Vice-Chairman, London Section, Plastics Institute), Dr. J. Gadsby. 3—C. H. Glassey, W. Mennie (Chairman, N.E. Section, P.I.), 4—V. C. Webber, T. C. Lord and R. Terry (all of Fraser and Glass). 5—J. S. Walker and V. C. Webber. 6—L. Everson-Davis and Dr. W. R. Davis (both of I.C.I.). 7—G. Hulse and V. H. Wentworth (both of Monsanto). 8—J. Fulford, J. Oppenheim, T. C. Corbett and Dr. W. R. Davis (all of I.C.I.). 9—J. M. Lassen, G. H. Morgan and E. T. Krogh (all of Bakelite). 10—D. S. Mahon (Bakelite), M. J. Hallett (Union Carbide (Australia)), C. T. Coward (Bakelite). 11—C. H. Rumble (C. H. Rumble Ltd.) and W. H. Osborne. 12—J. C. Issitt and J. O'Donnell (both of I.C.I.). 13—H. A. Tayler (Martin Supply Co.), B. B. Wadham and E. Ivers (Reeves and Sons). 14—F. L. Hate, L. Sliney, J. H. Blakeley and J. Fergus (all of Telcon). 15—P. E. Carroll (B.I.P.), J. C. H. Scott (Baker Perkins), E. A. Thorne (Flexile) and E. A. Davies (B.I.P.). 16—J. Fergus (Telcon), H. C. Walters (Thos. Bolton) and E. H. Gosling (Telcon)

AT THE ANNUAL CONFERENCE

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International Macromolecular Symposium 1959

THE Annual Symposium on Macromolecules held under the auspices of the International Union of Pure and Applied Chemistry took place this year at Wiesbaden, Germany from October 12-17.

The register of delegates numbered more than 1,200 from 25 countries, five plenary lectures, 36 main lectures and 188 short papers were presented and discussed. It was appropriate on this occasion that the conference was held only a short drive from Freiburg, where a mere 30 years ago H. Staudinger first proposed that substances such as polystyrene and natural rubber were relatively very large molecules and not mysterious aggregations of the molecules which had been almost exclusively selected for fundamental study until that time. From the strong opposition to the early polymer concepts to a conference of this magnitude devoted to macromolecular science in only certain of its fields is indeed a contrast.

The organizers set out to bring together polymer people of many specialities. The five sections of the programme dealt with the physics of macromolecules, molecules in solution, reaction mechanisms, new organic and inorganic polymers, natural polymers and model substances. Two large and excellently equipped conference halls and several smaller rooms in the new Rhein-Main Halle easily accommodated the delegates.

The mass of technical material was vast, a reporter cannot be in two or more lecture halls at one time, mental exhaustion calls for occasional departures to the surrounding gardens. Only a selection of the scientific work can be given therefore. Nevertheless the critical discussions and comments on the papers suggest that the following observations are of some of the more important matters.

Mechanical Energy

Professor W. Kuhn of Basel, who around 1935 was the first to consider quantitatively with success the conformation of a linear molecule on which elasticity theory is based, considered the principles of obtaining mechanical energy from polymer systems. He made the point at the outset that total amount of work done by natural polymer systems, the muscles, was still greatly in excess of that of all machines and was of obvious personal interest to polymer workers. He then went on to describe a fashioning at Basel of polymer strips composed of swellable and non-swellable polymers alternately which contracted and expanded only in one dimension and had performed prodigious amounts of work. A mathematical argument was put up which fitted the experimental observations.

Probably the highlight of the conference was the paper of Professor P. Debye of Cornell University. Debye is of course renowned for his stimulating material and style. Now, just when his ideas on light scattering for measuring the shapes and sizes of molecules seemed to be settling comfortably into routine technique, Debye has injected a new idea awakening enthusiasm in those in this highly specialized field and which will lead to awakened research effort. A neglected region of very small angle scattering has been shown to reveal information on molecular state, and has been applied by Debye to liquid systems near the critical state and to gels such as silica gels which are largely air 'holes.'

Crystallization Behaviour

Academician W. A. Kargin of the USSR described observations of crystallization behaviour for one or only a few molecules in droplets by very refined electron microscope studies. In summary, Kargin maintains that polymers either adopt a globular or a lamellar bundle form depending on physical conditions and concentration. If substantiated, it would seem that present text-book descriptions of polymer molecules wandering into crystallite or amorphous regions is likely to need drastic re-writing.

Five of the main lectures were given by UK chemists. A. Keller (Bristol University) described crystallization of polymers along somewhat similar lines to Kargin. C. H. Bamford (Courtaulds, Maidenhead) described recent results on the synthesis of polypeptides involving a nice explanation in terms of helix form after a certain chain-length. W. F. Watson (RABRM, Shawbury) surveyed the work on mechanical energy causing chemical reaction in polymers, bringing many observations in mastication and milling together as due to shear-induecd reactions and illustrating how the knowledge of these processes has led to new variants such as in the production of block polymers. J. C. Bevington (Birmingham University) gave an account of the use of radioactive isotopes in quantitative investigation of polymerization reactions. D. H. Whiffen (Birmingham University) described very clearly the application of electron spin resonance machines for a direct counting and characterizing of free radicals. A complementary lecture on that other tool recently acquired by the polymer workshop, nuclear magnetic resonance, was presented for W. P. Slichter (Bell Telephone, USA) showing the detailed discrimination now possible in the changes in polymers from glasses to rubbers. Special mention should also be made of the lecture of H. Deuel (Zurich) on the modification of silica-particle surfaces by chemical reagents. (Two special issues of *Makromolecular Chemie* will be on sale containing the plenary and principal lectures.)

The preprints of the short papers weighed over 3½lb. and would have required weeks for reading through. The papers were bravely tackled about 3.30 p.m. each day after several hours on the main papers, only a few minutes being available on average for a paper, and any interesting discussion prolonging the official session till the evening and till after 8 p.m. on at least one day. Much interesting material was embedded in the mass. However it is fair to say that a good number of communications seem to have been drafted for domestic justification for attendance. In view also of no practical provision for mitigating language difficulties in discussion, these sessions were generally considered disappointing.

Clearly a conference with world-wide representation must represent many compromises. It is the reviewer's opinion that the organizers have some lessons to learn from this conference. The prior organization was excellent and the programme most meticulously devised, unfortunately however being very inflexible when up against various human frailties. The number and quality of short papers should be most carefully considered and refereed. Arrangements for eating together and residence halls, as at Nottingham last year, are more satisfactory than the less sociable hotel method.

Arrangements have already been announced for the conference in Moscow in June 1960. (The preliminary notices again suggest a plethora of short communications.) In 1961 the conference will be held in Canada and Dr S. R. Palit is making a strong bid for an Indian venue in 1962.

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VIEWS and REVIEWS

Hard Rubber

IN its *Materials of Construction*, I/EC (under the 'Chemical Engineering Reviews') has—as since 1949—selected my old friend, Henry Peters (Bell Telephone Laboratories) to discourse on *Hard Rubber*.

During the two years covered by his review (1957 and 1958) Peters states that the emphasis appears to be on the use of high styrene-butadiene resin.

In his review of *Books* and *Reviews* he draws attention to the fact that every year the substitution of one or more plastics for rubber is voiced. It has been stated by some in the plastics industry that 'except for a few isolated applications' hard rubber would probably be replaced by plastics in 1960. A canvas of some hard rubber companies in the eastern United States showed that in some applications hard rubber had been replaced by plastics and *vice versa*. Also some companies have reported that the use of hard rubber had increased each year since World War II.

From all indications hard rubber has weathered the storm, an opinion shared by W. D. Scott, who points out that during the last five or ten years there has been an immense increase in the use of hard rubber linings for tanks, pipes, valves, etc. (*RJIP*)*. In the same period a number of new plants have been set up and the capacity of the industry has been greatly increased. Moreover, this increase in demand is backed by the growing appreciation of the advantages of hard rubber in corrosion and abrasion resistance.

Dr J. R. Scott's Book

'The hard rubber industry is indebted to J. R. Scott for his excellent new book which deals with the physical, chemical, and electrical properties of natural and synthetic hard rubbers.' This is an appreciation by a fellow expert which Dr Scott will appreciate.

To complete the direct reference to the literature of the subject there is a reference to the reprint of the ASTM describing and discussing the merits of the Shore durometer for testing; and the BSI publication of a brochure for electrical grade hard rubber. A. Cooper also has published a comprehensive survey of expanded hard rubber.

During the past two years fundamental research has been represented by three studies, although each one has a novel and original approach. The first of these comes from the I.C.I. who are 'attempting to replace part of the natural rubber with high-styrene butadiene resin to reduce the sulphur content without losing hardness. The hard rubber vulcanizates are tough, have an excellent moulded finish and can be compounded with a large assortment of organic and inorganic fillers.'

Effect of Temperature

It is, of course, well known that 'natural' hard rubber will not stand up to temperatures much above 65°C., whereas, it is equally well known that 'hard' made from butadiene acrylonitrile copolymers can withstand up to 110°C. without softening, and up to 150°C. without chemical deterioration. This unusual heat stability coupled with solvent resistance causes nitrile hard rubber to be used as a specialty lining for tank and pump applications. The merits of this 'hard' lining have recently been described.

The majority of battery boxes are still made from hard rubber. Plastics have made some inroads in this branch of manufacture. The substitution by plastics is due partly to poor impact strength and slow cure rate of 'natural.' It has recently been shown that the addition of a phenolic resin to a hard rubber improves these properties and also contributes to heat stability. 'Unfortunately, electrical data are not available, but it is believed that the elecrical properies are poor.'

Determination of Sulphur

Methods of determination of sulphur in organic substances are always of interest to analysts, hence 'A Semi-Micro Method of High Accuracy for the Determination of Sulphur in Wool' by Ballinda J. Myers, in the August issue of the *Transactions of the Journal of the Textile Institute* (Vol. 50, 8, pp. 494-503, 1959) should be of interest to the analyst.

An accurate method based on many hundred essays, is given for the determination of sulphur in samples of approximately 0.2 grams of wool. The accuracy and repeatability of the results is shown by the small range of 3.21 to 3.32% of sulphur with a standard error of 0.003%, for 61 determinations on Merino top and the quantitative recovery of wool sulphur in the presence of potassium sulphate.

The Method

The analytical procedure involves the wet oxidation to sulphuric acid by a nitric-perchloric acid mixture, and the subsequent precipitation and weighing of barium sulphate. The use of potassium dichromate as a catalyst for the oxidation, and as an indicator for its end point is discussed. The rate of the oxidation, and the quantity of nitric acid are critical, as slow oxidation produces low results. Excess perchloric acid or potassium dichromate interferes with the precipitation of barium sulphate through solubility and co-precipitation effects. The methods for addition of barium chloride, aggregation and filtration of the precipitate, and the prevention of co-precipitation effects are discussed fully.

Remarks on Method

The author remarks that macro-analysis is a highly specialized technique, and it is notoriously difficult to determine small differences in sulphur content by such

* The reference here is *R. J. Inst. Plastics*

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **DR SCHIDROWITZ**

a method. On the other hand, the standard macro-analytical procedure—developed by Barrit—such as the Carius, modified Benedict-Denis, and sodium peroxide fusion, are time-consuming, difficult in manipulation, and often require specialized apparatus.

Owing to the bulky nature of wool and the consequent difficulty of obtaining a satisfactory mixture with solid reagents, dry oxidation procedures are hazardous. The further remarks on wet oxidation, involving the use of nitric-perchloric acid have been comprehensively studied on a wide variety of natural products by Smith, who stated that the retention of sulphur in the oxidation liquors is quantitative. Various further remarks on modifications of the wet method will be found in the original.

Polythene Bottles in Analysis

Writing from the Chemistry Dept., The Imperial College of Science and Technology, L. S. Theobald calls attention to a possible source of error arising in analysis from the use of polythene bottles. He says (*Analyst*, Vol. 84, No. 1,002, p. 570):

'After using a weakly acid aqueous solution saturated with hydrogen sulphide, contained in a 200-ml. polythene wash bottle, I found that many fillings and rinsings of the bottle with water at intervals over several days were necessary to remove hydrogen sulphide from the bottle. Hydrogen sulphide from the wash liquid had passed into the polythene itself and was released into the space in the bottle when it was put aside. A similar effect was obtained when the bottle was filled with diluted aqueous ammonia, but here the ammonia could be more quickly removed.

'Bromine vapour from saturated bromine water rapidly enters the polythene, contact for about one minute between solution and polythene being sufficient to leave the latter coloured light brown. Contact for about 90 minutes leaves the polythene coloured a deep red, and as with hydrogen sulphide, many fillings with water with intervening periods of setting aside the empty bottle are necessary before the bromine is removed from the polythene. This removal is, of course, speeded up by passing a current of air through the bottle. . . .

'The permeability of polythene to certain gases and vapours is well known to the physical chemist, but the analyst may not be so well aware of the phenomenon, and it is the purpose of this note to direct his attention to what may be an unsuspected source of error in analytical work.'—L. S. Theobald.

(*Observation by P.S.*—The phenomenon observed is, of course, not *chemical*, but purely *physical*. Acknowledgment to the author of Note and Editor *Analyst*.)

Plastics in 1958

In their '*Technical Committees Report Progress*' ASTM *Bulletin No.* 240 (September 1959) reports on *Plastics* (D-20). The Committee reports that in 1958 nearly a billion pounds of polythene plastics were sold in such forms as unbreakable toys, containers, pipe, wire insulation, and packaging materials. Predictions are that this amount will more than double in the next seven years. Because of the recent developments in polyolefin plastics, which were discussed at some length by Herman Mark of Brooklyn Polytechnic Institute in his 1959 Marburg Lecture, Committee D-20 has established a new sub-committee to develop specifications for these materials.

Committee D-20 has long been concerned with polythene, and Specification 1248 is the basis for the present industrial types and grades of the material. In giving this work status, the sub-committee is recognizing the importance of these materials to the national economy.

Flammability

A new tentative test for flammability of plastics foam and sheeting (D 1692) has been published by the Society on the recommendation of the committee. This new test supplements other flammability tests for plastics, which have been available for some time, and provides for the first time a procedure covering cellular plastics. The flammability of plastics, as compared with other material, is a matter of interest in plastics used in building construction, etc.

Plastic Pipe

Plastics tests for rigid PVC pipe, and polythene pipe have been agreed upon for ballot by the plastics committee. It is expected that they will be available towards the end of the year.

Analysis and Testing of Industrial Materials

Committee E-15, consisting of nearly 100 members, representing over 60 companies, held its first full meeting at the 62nd Annual Meeting of the Society. Three main groups of sub-committees were established, these being with Chairmen: *General:* W. A. Kirklin, Hercules Powder Co., chairman of E.15; *Division A* on *General Methods*, E. G. Wiest, Du Pont Co.; *Division B* on *Production Methods*, J. T. Woods, American Cyanamid Co. Full particulars of the various sub-committees and of their objects will be found in the original.

Notes

Du Pont have issued the 'Index for "Elastomers" Notebook' (No. 4-9), publication 1959/60, and *Hypalon 40*, which although it is marked 'June 1959,' has only just reached me. This is a monograph by P. A. Peffer, J. B. Knox and A. J. Brandau, which tells the story of '40' compared with '20.' 'It has low nerve; high uncured strength, and good viscosity. Compared with "20," vulcanizates of hypalon "40" have improved tensile and tear strength, greater elongation, better abrasion resistance and low compression set. Its oil resistance is comparable with that of neoprene.' It is superior to the '20' in many more respects, and these are duly set out.

What appeals especially to me is that, in giving the physical properties of Hypalon '40,' the '*Health Hazards* in Handling' bear the answer 'None known.'

PHILIP SCHIDROWITZ

Questions Corner—91

(Second Series)

383. In hot-gas welding certain differences should be noted between different materials. Name some of them.

384. Polythene sprayed coatings are finding increasing use in industry. Give details.

385. What factors can lead to faulty welds in the hot-gas welding technique?

386. What type of welds are used in fabricating thermoplastic materials?

(Answers next week)

Answers to Questions Corner—90

379. If a polyvinyl acetate emulsion is diluted with water to give one of low viscosity it may be unsuitable for many applications. For instance, if the emulsion is being used for application to a porous surface it is essential to reduce the penetration to a minimum and hence a diluted emulsion would not be suitable. Thickening agents are therefore used to thicken the emulsion.

When selecting a thickening agent for polyvinyl acetate it must be one that is compatible with the polymer and emulsifying agents, etc., in the emulsions. In addition, consideration must be given to colour, light stability, biological attack and cost. Thickening agents of high molecular weight are, generally, more effective than those of low molecular weight.

Various natural materials can be used but they are, generally, not so effective as many synthetic materials, and are liable to biological attack. Casein is used to a large extent, partly because it is relatively cheap, but it is necessary to use a fungicide or bactericide with this agent. Other natural products include dextrin, gum tragacanth, glue, gelatine and starch.

Of the synthetic materials the most important are polyvinyl alcohol and various cellulosics such as methyl cellulose, hydroxyethyl cellulose and ethyl hydroxyethyl cellulose. These are non-ionic types. Of the ionic types the most popular is sodium carboxymethyl cellulose.

380. Heated tool welding of thermoplastic sheet is, essentially, a heat sealing of a film of the material. A heated tool is used to bring the plastic material to a fusion temperature. As soon as the surfaces of the two pieces to be joined are sufficiently softened they are removed and quickly joined together, being held firmly in position until cool to form a strong joint.

Electrical strip heaters, hot plates or soldering irons are convenient tools but care must be taken that any excess material left on the heated tool is scraped off before the next welding operation is commenced.

During the operation the pressure between the softened surfaces must be sufficient to press out any air bubbles that are likely to be present. It is also important that the time interval between removal from the heated tool and the joining together of the surfaces should be as short as possible. The longer this interval the lower the weld strength.

This method is used in welding pipes and may also be used in the assembly of moulded parts.

381. In welding thermoplastic sheets the strength of the weld depends on several factors and not least on the skill of the operator. It is unwise to start a welder on custom assembly before he has had practice in the use of the gun, etc., on different types of experimental welds.

The strength of the base material, which naturally varies with the type of plastic used, is another factor that should be considered, as is also the strength of the filler rod.

The type of weld is also important and, generally, butt welds give the best strength. For economy and strength, structural corners are best produced by bending whenever possible.

The time which elapses between welding and testing must also be considered when determining weld strength.

In the hands of a good operator linear polythene should give values between 50% and 80% but high density polythene may produce welds up to 100%.

Dressing or grinding a weld is not recommended except where flange connexions must be made. The values may be reduced as much as 25%.

382. The choice of resins for the production of glass reinforced plastics will depend on the particular process to be used, and the final application. The process may involve heat and pressure, or be required for cold-setting methods. The colour and clarity also affect the choice.

Some of the resins that are finding commercial use are:

Polyester resins.—The reaction of organic acids and alcohols produces a class of material called esters. When the acids are polybasic and the alcohols are polyhydric they can react to form complex esters, called polyesters, *e.g.* phthalic anhydride and glycerine. These are called alkyds. If, however, the acid or alcohol contains an unsaturated carbon bond the polyesters formed can react further with other unsaturated materials, *e.g.* styrene. This results in the formation of a three dimensional cross-linked structure that is characteristic of thermosetting resins.

Polyesters shrink when cured (3-8% by volume) mainly due to shrinking of the cross-linking monomer. Some of the shrinkage can be markedly reduced by the use of suitable fillers.

Epoxy resins.—These are produced by reacting epichlorohydrin and bisphenol A, which can then be cross-linked to form a thermosetting resin with an amine type compound. They have a lower shrinkage factor than the polyesters and have good adhesion to a variety of materials.

Phenolic resins.—These are derived from phenols and aldehydes and are cured by the application of heat and pressure.

Melamine resins.—These are produced by a condensation reaction between melamine and formaldehyde.

Silicone resins.—These materials are based on silico-organic compounds and have exceptional heat resistance. They are available as solutions in organic solvents and the curing cycles are long.

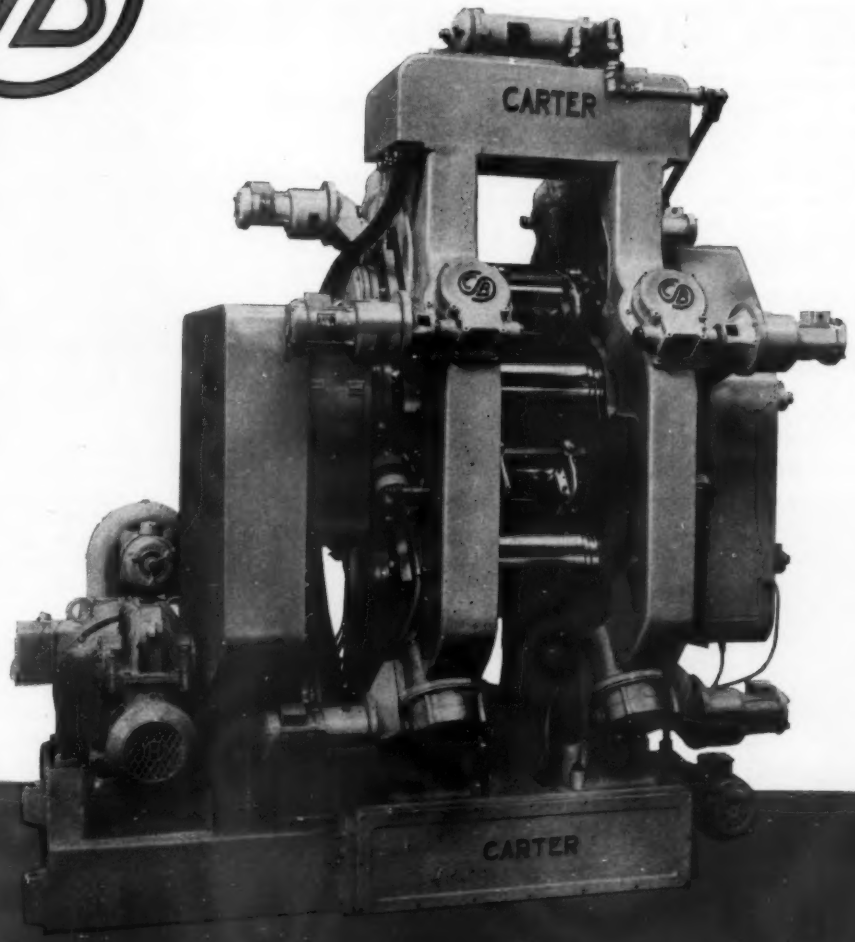
Polyvinyl chloride and polystyrene.—These are both thermoplastic materials and their use has been restricted mainly because of their relatively low heat resistance. However, their use has been on the increase for certain applications where heat resistance is of minor importance.

(More questions next week)

Polly Ester Says . . .

'Ion exchange — scrap metal merchants business'

RUBBER–PLASTIC MACHINERY



FOUR ROLL INCLINED "Z" TYPE CALENDER

CARTER MELLOR ST. ROCHDALE

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MEN *and* MATTERS

A Review of People and Events

by George A. Greenwood

AN occasion which will have aroused a good deal of interest in rubber circles throughout this country and the world was duly celebrated last weekend. It was the 80th birthday on Sunday of Sir Charles Tennyson, a man of two careers. He made a great success in industry, as for 20 years secretary to the Dunlop Company, a post from which he retired only about ten years ago, and as a grandson, of course, of the great Lord Tennyson, the Poet Laureate of Victorian days, he has always been a powerful champion of the arts. Incidentally, at a time like this one thinks of him as a champion in the campaign to raise the standard of industrial campaign.

There was a great gathering of families and friends at the birthday dinner the day afterwards, when his portrait in chalk recently completed by Augustus John, to the commission of King's College, Cambridge, was on view. Sir Charles was a King's scholar at Eton before he went to King's College, Cambridge, with an Eton scholarship, but what I am now reminded about, and what so many others have forgotten, is that he was called to the Bar so long ago as 1905 and had many years of legal service at the Office of Works and the Colonial Office before industry claimed him.

Dunlop Appointment

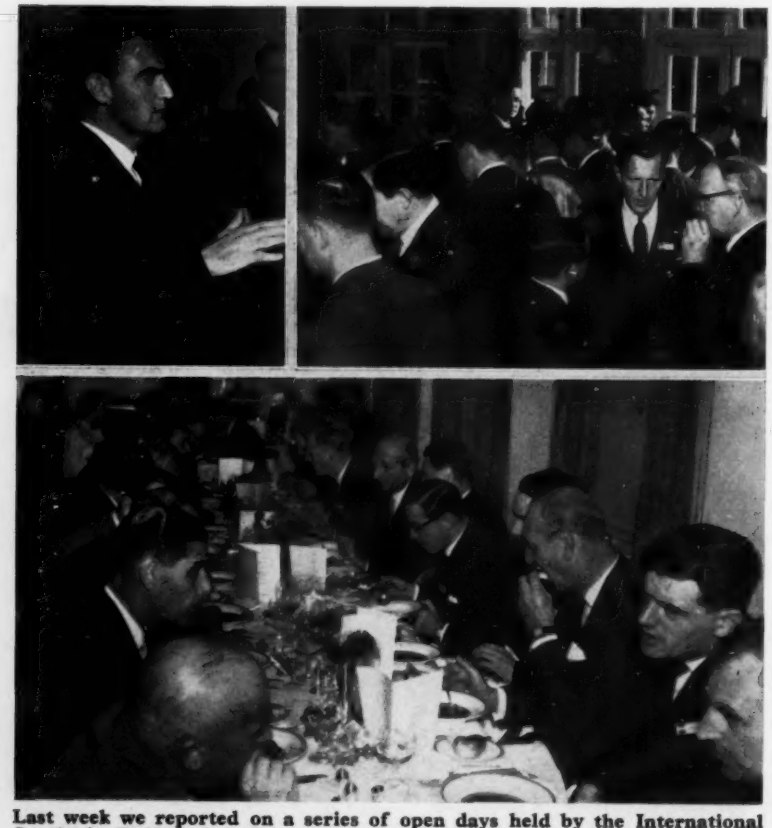
Mr John Rudd, previously Upholstery Consultant (North) for Dunlopillo, has, I am informed, been appointed Upholstery Consultant for the whole of the UK. This is a new appointment in the organization and Mr Rudd will divide his time between the Rochdale headquarters of Dunlopillo and their London office at Berners Street. As Upholstery Consultant, he will be responsible to Mr D. E. Mackey, the Dunlopillo Upholstery Sales Manager.

MR JOHN RUDD, Dunlopillo's upholstery consultant for the UK

Planting Changes

Some interesting changes are occurring in the ownership and control of more rubber-growing companies. Although they do not in all cases involve the disappearance from the scene of men who for years have been familiar to most of us in controlling capacities, they do mean some new orientations in personnel.

I understand that following the announcement the Kamuning (Perak) Rubber and Tin Company was offering to buy the KMS (Malay States) Rubber Plantations undertaking, this deal is now in process of going through, and is to be completed, subject to final approval by the shareholders, by November 30. Kamuning is acquiring the estates and certain assets but excluding cash, Government securities and replanting cesses repaid, on a share-for-share basis. It is not my job to enlarge here on the rest of the financial considerations involved, excepting perhaps to say that under the winding-up terms, Kamuning is paying £2,200 to Sir John Hay, chairman of KMS, and £1,350 each to the other directors, Mr K. M. G. Anderson and Mr D. O. Wright, for loss of office.



Last week we reported on a series of open days held by the International Synthetic Rubber Co., Ltd. Pictured above are some of the UK rubber manufacturers who toured the plant. At top left, is D. A. Bennett, director and general manager of ISR

SARMCOL

CONGRATULATES 'BIG JIM' MacALPINE AND THE VAAL REEFS* TEAM IN SOUTH AFRICA

* One of the major gold mines under development in the Transvaal

THEY BROKE THE WORLD SHAFT-SINKING RECORD—922 ft. SUNK AND 940 ft. CONCRETE LINED IN 30 DAYS

This outstanding achievement successfully shatters the Russians' record of 868' in 30 days.

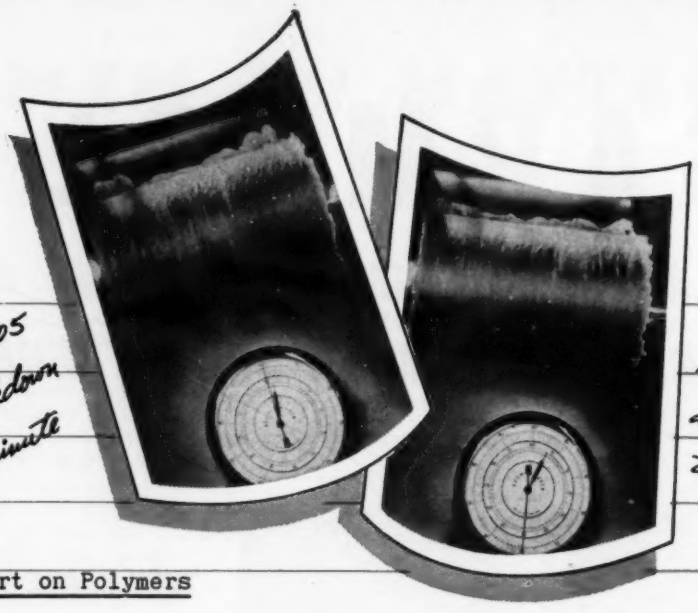
Master Sinker 'Big Jim' MacAlpine says: "Records are made to be broken – and Sarmcol Shaft-Sinking Hose certainly helped us break this one. We're using Sarmcol Hose exclusively on the job."

SARMCOL **SHAFT-SINKING HOSE**

THE S.A. RUBBER MANUFACTURING CO. LTD., BOX 29, HOWICK, NATAL AND BOX 4161, JOHANNESBURG

Manufacturers of rubber products for Mining, General Industry and Agriculture

S 4058



Report on Polymers

ASRC POLYMER 3105 ELIMINATES
BREAKDOWN STEP IN PROCESSING

Photographs above show how ASRC 3105 gives head start over competitive polymer 1502 in processing. Rubber and fillers can be introduced simultaneously without breakdown time before mix — with considerable savings in processing time and reduced power costs.

ASRC also offers additional advantages —

1. Absorbs 20–30% more fillers
2. Can be used as softener with other polymers to improve processing of compound
3. Less shrinkage — with high tensile and good tear resistance in sponge rubber
4. Compatible with various resins and plastics
5. Best color available in polymers

Test samples and literature on ASRC 3105 available on request.

For highest quality synthetic rubber...efficient service timed to your needs...personal attention to your orders ...prompt shipments — call your ASRC distributor.

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Rubber Conference

WEST BERLIN IN 1960

THE next general meeting and lecture conference of the Deutsche Kautschuk-Gesellschaft will be held from October 4-7 1960 at the Kongresshalle, West Berlin. Experts from Germany and other countries will give lectures on topical problems relating to the chemistry, physics, and technology of natural rubber and, in particular, of synthetic rubber; on work in the field of tyre and testing technology, and on the stage of development reached by the textiles of interest to the rubber industry. Results of recent research and practical experience will be reported in a general exchange of scientific, technical, and economic experience. Social events will promote personal contact among all those taking part.

The lecture system adopted at the conferences of recent years will be retained, and participants will again receive a printed publication of the lectures with their membership cards. At the conference the authors will give short lectures on their subjects, and these will be followed by discussions. Films on rubber will be shown on the second and third days.

Special lectures are still invited and those prepared to give them are asked to contact the DKG Geschäftsstelle Frankfurt / Main, Mainzer Landstrasse 66, by January 31 1960 at the latest.

The Kongresshalle, West Berlin—venue of the 1960 conference of Deutsche Kautschuk-Gesellschaft

Rayon Hose

A new rayon yarn reinforced long-length multi-purpose hose has been developed by BTR Industries Ltd., Herga House, Vincent Square, London, S.W.1. Finished in a distinctive maroon shade this hose is of standard two-braid construction and very flexible, but because of its pressure capability will do much of the work of three-braid cotton hose. A further advantage gained by the use of rayon is that it allows a synthetic tube to be used at high pressure. For use with oil, grease, solvent, chemicals, spray and air, the new hose is available 'off the shelf' in sizes ranging from ½in. (working pressure of 475 psi) to 1½in. (working pressure of 135 psi).

CANADIAN RUBBER

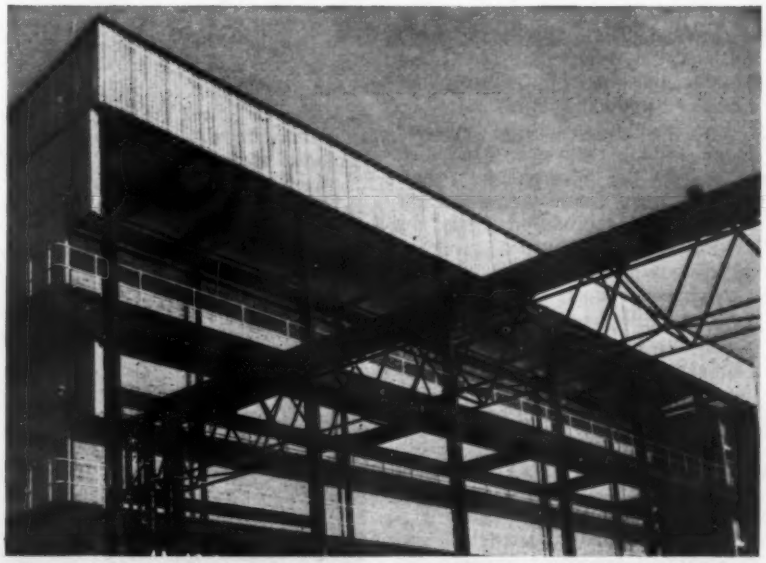
As result of continued good demand from all sources, Canadian consumption of natural, synthetic and reclaim rubber in Canada in July increased 14% to 20,587,000lb. from last year's corresponding total of 18,023,000lb.

Natural rubber consumption rose to 7,930,000lb. from 6,551,000; synthetic to 9,969,000 from 8,715,000, while reclaim fell to 2,688,000 from 2,857,000.

Amount of rubber consumed in the manufacture of tyres and tubes increased to 15,724,000lb. from 13,882,000; in footwear to 1,158,000 from 1,013,000, and in other products to 3,470,000 from 2,875,000.

Stocks of natural rubber at end of July included 3,619 long tons of natural rubber, compared with 3,210 at end of previous month and 3,588 tons July 1958: 8,365 long tons of synthetic compared to 6,606 tons at end of previous month and 8,570 tons at end of July 1959; and 1,912 tons reclaimed against 1,470 previous month and 1,303 tons a year ago.

Domestic production of synthetic bounced in July amounting to 9,217 tons compared to only 43 tons previous month when strike at Polymer Corporation was on. Domestic production of reclaimed in July amounted to 606 tons compared to 512 month before.



Filon, a translucent structural sheeting manufactured by B.I.P. Reinforced Products Ltd., is made from polyester reinforced glass fibre by a continuous process. Available in any desired length, it is normally sold in standard sheets with a variety of profiles to suit conventional sheeting, as well as several decorative profiles. It is seen above used as cladding on the fascia of machinery bays at a new East Coast factory. The newly introduced coloured filon will be on show for the first time at the Building Exhibition, November 18-December 2 at Olympia

Pattern-Making in Plastics

4. COMPLETION, REPAIRS AND CONCLUSION

(Concluded from October 31 issue, page 512)

By H. G. KING

Summary

The introduction of plastics as a material for the manufacture of foundry patterns has opened a wide field for interesting development. For the past three years the possibilities of using this type of pattern in the iron, steel, and brass foundries have been investigated and developed in the Crewe Locomotive Works, by the author. After initial difficulties and trials with various types of resins and materials, the use of plastics has increased with such outstanding success, in both the pattern shop and the foundries, that pattern-making in plastics has been established and is now a recognized method of manufacture. As a result of the research into the use of this material, there are now over two thousand plastic patterns in use on moulding machines of various types, and these notes have illustrated the advantages that have been found to accrue from this comparatively new practice. The resins used in the manufacture of the patterns considered in this paper are the product of one particular firm; the formulas quoted are peculiar to these products and are not of a universal nature.

WE have now produced solid cast patterns, patterns with a preformed core, and laminated patterns, and reached the stage of completion.

The removal of the pattern from the plaster mould will present no difficulty providing the application of sealing lacquer and release agent has been thorough. A saw cut will weaken thick sections of plaster, and the mould can then be broken away from the plastic cast. The top face of the cast will now require machining to provide a true face for assembly to the moulding machine plate, and a Pattern Miller or Recessing Machine using carbide tipped tools will prove ideal, although for smaller patterns a sandpaper disc will serve just as well providing the shape of the pattern permits a firm hold, and offers suitable points for measurement.

Should it be decided to use a sandpaper disc for this operation care should be exercised not to create too much heat, as this may cause distortion, particularly if the pattern is of thin section.

It is sometimes claimed that the patterns are now ready for assembly to machine plates without any hand finishing, but, whilst it is agreed that a highly polished mould will produce a cast of comparable finish, rarely do pattern moulds, owing to intricate design, lend themselves to high polishing. It is considered necessary, therefore, firstly to remove any imperfections reproduced from the mould, and secondly, to give the entire pattern surface a light sanding with abrasive paper. The extent of this work will depend on the quality of the mould, and, of course, the standard of finish required, but, as this plastic material does not contract or distort there will be no question of working to templates but merely of obtaining surface finish.

Repairs to Patterns

The exceptional strength and durability of laminated patterns will as far as breakages is concerned most probably confine repairs to solid and shell cast patterns, and are comparatively simple. A plastic material has recently been introduced and is available in two forms, putty and cream, and being almost universally adhesive lends itself very well to plastic pattern repairs. For building up damaged areas, or rebuilding broken parts, the putty grade will be most suitable and for shallow surface damage the cream grade will be chosen.

Both grades are supplied in two parts (a) the epoxy resin with filler, (b) the hardening agent with filler, and the thorough mixing of (a) and (b) will commence the process of hardening although the material will remain flexible and usable for at least one hour at room temperature. The area of break must be clean and free from grease, and the putty grade can then be built up to approximate shape allowing a minimum for filing to dimension. For surface damage the cream grade can be spread over the area, again allowing an excess for filing to size. Complete hardening will take about eight hours at normal room temperature, but this can be accelerated by placing in a temperature of 160° to 180°F. thus reducing the period to about one hour. Should a broken piece from a pattern be available this can be replaced by using a cream grade as an adhesive.

Conclusion

From this review of the developments in the use of Epoxy Resins it is hoped to reveal to some extent the immense possibilities of plastics for pattern making, particularly when patterns of high quality are required. For this class of work plastics will compare favourably with the very best of metal patterns with regard to finish and if of laminated structure, durability. Heavy metal pattern equip-

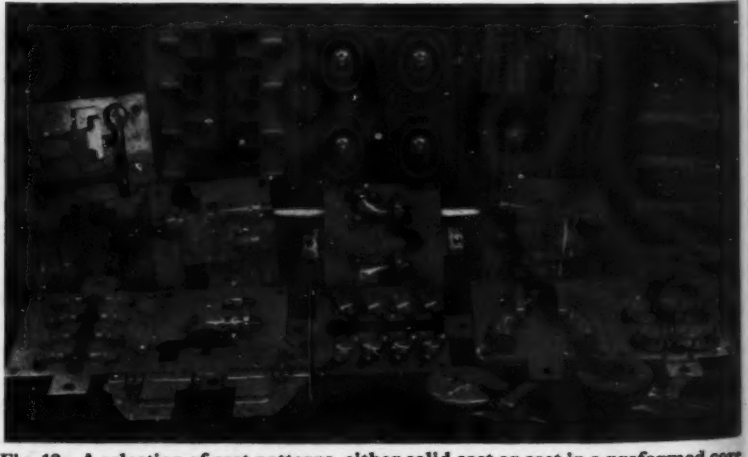


Fig. 13. A selection of cast patterns, either solid cast or cast in a preformed core

no joke without fire...

MOST of the legendary figures of mythology seem to have lived it up, in a remarkable variety of fancy pursuits. Not so Vulcan, god of fire and furnace. He could claim to be one of the first industrialists. Little did he dream that the application of *heat* to rubber and sulphur would later engender a process called "vulcanisation". Or that another hot "mix" — rubber and phenolic resins — would eventually produce FORTIFLEX, a Dunlop material of infinite service to home, business and industry. This material is malleable but extremely hard-wearing, non-corrosive, noiseless, rustproof, stands any amount of assault and battery and can be "tailored" to specification — to make anything from industrial containers to domestic dustbins, coke hods to wheelbarrow bodies. It is yet another of the rewards of Dunlop research.

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CPH/PRESS/8

F1

ment can impair the efficiency of a moulding machine, and the lightness of plastics, about half the weight of aluminium, will be appreciated. There is also a considerable saving in manufacturing time and cost and this saving is reflected should a pattern repair or alteration be necessary.

Whilst the cost comparison between wood and plastic may be unfavourable to plastic, and this is mainly due to the high cost of resins and hardeners, the many advantages offered by plastics should be considered. The superior finish of the plastic pattern is unquestionable. Exposure to varying atmospheric conditions during use and storage and the association of warm and damp sand has no effect on plastic patterns. The improved flow of sand over the plastic surface will produce moulds of more uniform density. Plastic patterns leave the sand so cleanly and freely that the use of cores can in some instances be reduced. Coreboxes need little wrapping and this in itself shows considerable saving in repair costs, apart from the advantage of producing more accurate cores.

When it is remembered that the use of epoxy resin for pattern making is still a comparatively new development, and the results so far obtained possess such outstanding merit, the establishment of plastics in the pattern shop appears assured. It gives the pattern maker the opportunity to produce patterns and coreboxes of a quality hitherto unknown to foundries as a general issue until the introduction of this most interesting material.

Fig. 15. A selection of laminated patterns

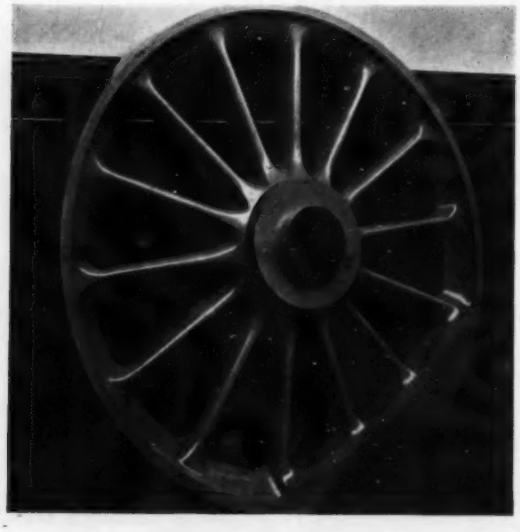

Fig. 14. A completed 4ft. dia. locomotive wheel centre pattern

The author expresses his thanks to Mr I. C. Forsyth, Works Manager, Crewe Locomotive Works, for the facilities and assistance he has given in producing this paper, and for his encouragement and the interest he has shown throughout the whole period of plastic development. He also records his thanks to the foundry supervisors for their tolerance during the experimental stages of plastics in pattern making, and finally, to the group of pattern makers who have made these patterns, and whose interest, enthusiasm and skill is reflected in the high quality of the work they produce.

	Casting Mix.	Facing Mix. (A)	Facing Mix. (B)	Vermiculite Mix.	Impregnating Mix.
Epoxy resin M.1075	100	100	—	100	100
Epoxy resin paste M.1232 ..	—	—	100	—	—
Hardener—Modifier M.1161 ..	65	65	65	65	65
Filler—marble flour	75	60	60	—	20
Vermiculite Grade 5	—	—	—	100	—
Aerosil	—	6	—	—	—

All measurements—parts by weight.

Formulations used in mixes described in these articles

Material Suppliers

Epoxy resin 'Epophen,' hardener modifier, epoxy resin paste, sealing lacquer, slate powder—Leicester Lovell and Co., North Baddesley, Southampton. Fibreglass fabric ACK301, Fibreglass matting (1oz.)—Turner Bros. and Co. Ltd., 216 Corn Exchange Buildings, Manchester 4. Cork blocks 3ft. x 3ft. x 2in.—Cork Products Ltd., Reading. Vermiculite, Grade 5—Dupre Vermiculite Ltd., 39-44 New Broad Street, London, E.C.2. Release agent (creamed silicone wax)—J. Goddard and Sons Ltd., Nelson Street, Leicester. Plaster (low expansion)—Cafferata Plaster Ltd., Newark, Notts. Barrier creams—Scientific Pharmacals Ltd., 1 Eden Street, Hampstead Road, London, N.W.1. Pigments—Ferro Enamels Ltd., Wolverhampton. Marble flour (Italian grade)—R. W. Greeff and Co., 31-45 Gresham Street, London, E.C.2. Double bond (cream and putty)—Kenilworth Manufacturing Co., West Drayton, Middlesex. Pattern enamel—W. Pickard and Co. Ltd., Rutland Row, Sheffield 3.

Glass fibre and manufactures, imports of which have been restricted from the dollar area, are included in a list of goods which have been freed from import control as from Monday November 9. This was announced in Parliament on November 4.

BELT-CONVEYING COSTS CUT BY HALF AT I.C.I. PLANT

Butyl Rubber covered belt has already lasted 3 times as long as any other—and still no sign of wear

By installing Butyl Rubber covered conveyor belting at their Billingham Chemicals Plant, I.C.I. have cut the cost of belt-conveying phosphate fertilizer by half, and the belting still shows no sign of wear.

WORKING LIFE TREBLED

Owing to the heat of the fertilizer at this stage in the process (*about 115 degrees centigrade*), and the usual damage due to moisture and ageing, even the best synthetic rubber belts used previously have worn out in a year, after shifting about 132,000 tons. A second Butyl Rubber belt was installed elsewhere in the plant three years ago and has shifted 500,000 tons.

COST STILL GOING DOWN

The Butyl Rubber belting is still in perfect condition. And, although it is impossible to forecast its future life, it is expected to reduce the cost of belt-conveying still further.

When ordering conveyor belting it will pay you to specify

Esso Butyl

The man-made rubber with the longest flex life and the greatest resistance to heat, corrosion, ageing, ozone, moisture and tearing. (For handling specially hot materials, Esso Butyl covered belting is even more efficient on a Terylene base.)

Esso Butyl is identical to 'Enjay' Butyl which has established a high reputation in the United States

For information about Esso Butyl Rubber

Telephone: HYD 7030, or write to Esso Petroleum Co, Ltd, Chemicals Dept, 50 Stratton St, Piccadilly, London, W1

IRI Golfing Society

MANCHESTER SECTION

THE Manchester Section of the IRI Golfing Society held its competition for the Bridge Trophy on Wednesday September 9 1959. The competition was held, probably for the first time in the history of the Bridge Trophy, under ideal summer conditions. Like most courses, after this summer, it was playing rather short under the dried-up conditions, but despite this, some remarkable scores were turned in.

Thirty members took part and were entertained at dinner in the evening by David Bridge and Co. Ltd. Prize-giving took place after a meal and Mr K. Bradshaw, representing David Bridge, presented Mr B. Fitton with the Bridge Trophy. Mr Fitton returned a score of 70 less 7, giving a nett score of 63. Mr A. Sanders was the runner-up with 84 less 18, 66 nett.

Some idea of the standard of play is indicated by the fact that the highest nett score returned on this afternoon was 82.

Sufficient prizes, in addition to the Bridge Trophy, were supplied by members to enable the following to be given: Winner, Mr B. Fitton, 70−7=63; runner-up, Mr A. Sanders, 84−18=66; best gross, Mr K. Mills, 81 gross; best first nine, Mr A. Lord, 35½ nett; best second nine, Mr S. Heywood, 32½ nett; best nine hidden holes, Mr N. Liddiard, 23 gross; second nine hidden holes, Mr A. Tonge, 21 gross; special prizes, Mr A. W. Ayres, 82 nett, Mr K. Bradshaw, 82 nett.

Additional prizes were generously donated by: Mr T. Martin, Anchor Chemical Co., Frank Shaw, Francis Shaw and Co. Ltd., H. K. Mills, Rubber Regenerating Co.

US RUBBER STOCKPILE SALES

The General Services Administration (GSA) announced on November 4 it had sold 5,796 long tons of crude natural rubber from the US national stockpile in the period October 16 to 30. The Administration said that future sales figures of this rubber would be made available on a regular monthly basis.

GSA reiterated in the announcement that it planned to sell approximately 50,000 long tons in the US Government fiscal year ending on June 30 1960. GSA said it would continue to negotiate sales by telephone on the 'basis of prevailing market prices and in such a manner as to avoid disruption of the usual rubber market and at the same time protect the United States against avoidable loss.'

'The sale without replacement of stockpiled rubber requiring rotation during the current fiscal year to prevent deterioration will involve an estimated quantity of approximately 50,000 long tons,' the GSA announcement stated.

First Indian SR Plant

FIRESTONE PROJECT

FIRESTONE are to establish complete facilities for manufacturing synthetic rubber in India. The Government of India has given official approval for a $30m. project which will include plants for the production of butadiene and styrene, the principal raw materials, as well as a copolymer plant for the manufacture of the final product, synthetic rubber.

This will be India's first synthetic rubber project and will have an annual capacity of 30,000 tons, with an initial production of 20,000 tons. Construction is planned to start at once and production will begin in about 21 months.

The Firestone Company has been established in India for many years, first as a distributor and since 1939 also as a manufacturer, with extensive facilities in Bombay for the production of tyres and tubes for passenger cars, trucks, buses, farm equipment, off-the-highway equipment, and scooters. The facilities in Bombay recently have been enlarged to many times their original capacity to meet India's expanding transportation needs.

Sturge Appointments

Among new staff appointments made by John and E. Sturge Ltd., Wheeleys Road, Birmingham 15, is that of Mr L. R. Tomlinson, who has joined the company from Allied Colloids Ltd., as a technical sales representative. He will be based at Birmingham and have special responsibility for the rubber, plastics, paint, printing ink and paper industries.

The winner of The Bridge Trophy, Mr B. Fitton, is seen here with other members of the Manchester section who include, *left to right, back row,* **G. Manktelow, H. Brown, R. Russell, S. Clarke, A. Saunders, E. C. Swann, T. H. Redfern, S. Heywood, F. T. Diggle, A. Tonge, W. Williams, R. Waring, A. Lord, T. Martin.** *Front row,* **A. Read, A. Kenyon, E. Cheetham, K. H. Mill (Captain), K. Bradshaw, F. Shaw, D. Oliver, I. Ferguson**

Plantation Commentary

SP RUBBER PROGRESS

by our Malayan Correspondent

THE report by the Rubber Research Institute that Malaya shipped 984 tons of superior processed rubber in the first half of this year seems to indicate that SP rubber is well on the way to becoming an established success. The quantity is small but total shipments were 1,149 tons last year and on the result of the first half-year there is every hope that shipments will total about 2,000 tons this year.

Four establishments are now producing SP rubber under licence from the Institute. SP rubber is natural rubber which is specially treated with a preparation which makes it possible for it to be successfully extruded while still retaining the good qualities of natural. Because of the difficulties formerly found in extruding natural rubber, which tended to lose its shape, manufacturers had preferred synthetic.

An official of the Rubber Research Institute said: 'We feel that this is one of the most promising developments ever to emerge from our laboratories. In certain aspects of the industry it makes all the difference in keeping the manufacturers interested in the natural raw material and dissuading them from turning to synthetic.'

Countries purchasing SP rubber now include the United States, Britain, New Zealand, Australia, Japan, Germany, Italy, South Africa, France and Belgium. It has not been possible to interest Russia in SP rubber despite the large quantities of ordinary natural purchased by that country, but a booklet in Chinese has been produced which it is hoped will arouse interest behind either the 'Bamboo' or 'Iron' curtains.

SP rubber is a comparatively recent development and production started at the Institute about 30 months ago. Crepe was first followed by SP sheet which has proved the most popular. Eventually local producers were encouraged to take a hand and about four are now turning out SP grades. An air dried version of SP sheet which was produced by the Institute has not proved as popular as the smoke-dried product.

The Institute has also turned to introducing the SP properties into low grade rubber and early this year produced the first 10 tons of SP brown crepe. In April and June about 70 tons were exported, mostly to manufacturers who wished to test it for their own requirements before placing orders.

'As far as we are concerned this is not the end of the story, there are other fields we propose to turn to,' said the Institute official.

Politics

Malaya had its first Parliamentary elections on August 19 bringing into being the final parts of the Constitution which have until now been dormant. There will be a 38-member Senate which will act as the Upper House in the legislature with none of its members popularly elected but nominated from the 11 States and by the Paramount Ruler to represent certain special interests. There will also be an all-elected 104-member House of Representatives which will initiate most of the legislation and in which most of the Ministers will sit.

This year's elections were of far greater interest than the pre-independence elections in 1955 to a partially elected legislature when the Alliance Party, led by Tengku Abdul Rahman, the former Prime Minister, gained 51 of the 52 seats.

There are ominous signs that the Alliance is in serious difficulties and these will inevitably have repercussions unless the cracks can be patched up. Its main platform has always been unity between the three main communities which is expressed in the way the Alliance is made up of a merger of interests of the three main communal associations in Malaya, the United Malays National Organization, the Malayan Chinese Association and the Malayan Indian Congress. By compromise and goodwill they have made the Alliance work and party policy has been decided in agreements reached between the three communal associations.

Six days before nomination day, however, certain Chinese members who are leaders of the Alliance put forward a set of demands tied up with the need to preserve Chinese culture, as they saw it, which led to Tengku Abdul Rahman dismissing the Chinese association from the Alliance. It was done in an unusual way with an uncompromising Press statement issued while the Leader of the Chinese association was meeting Malay leaders for the purpose of settling the points raised.

Subsequently this 'stab in the back,' as Tengku Abdul Rahman called it, was partly retracted by a majority vote and the Chinese association is back in the party. But the strain of the compromise was too much for many in the association and about 50 Chinese leaders resigned, a few of them to stand against the party as independents.

With the Chinese community split on the issue of preserving Chinese culture, between those who demand much more than Tengku Abdul Rahman can give and those who are willing to trust inter-communal unity, communal issues have played a much larger part than they would have done. There is no particular fear at the moment of them taking an exceptionally serious turn but a break in communal unity in a country such as Malaya, where the races are so evenly divided, can never be treated lightly.

Overseas Mission

The Malayan Estate Owners' Association has now pressed its demand for a mission to go overseas, including the Soviet Union and Communist China, to collect facts to help Malayan exports, with a memorandum that has been submitted to the Malayan Government.

The association has suggested that the mission, which would be on an official basis, could investigate the threat which synthetic poses to natural rubber in the consuming countries and see whether the governments of purchasing countries are prepared to enter into negotiations for further trade in natural rubber.

It is hoped that the mission would also be able to find out the attitude of rubber manufacturers overseas towards Malayan rubber, survey further markets for rubber and investigate what is being done by way of a technical advisory service and aid for consumers of natural rubber.

It has been suggested that the mission should have a person authorized by the Ministry of Commerce and Industry, a rubber planter, two representatives of smallholders, a representative of Asian estates, a packers' representative, a representative of the rubber trade, and two persons who would be competent to assess the technical needs of consumers and manufacturers.

In its memorandum the association pointed out that world production of synthetic in 1954 was 716,000 tons but had risen to 1,210,000 tons last year. Production of natural rubber which was 1,810.000 tons in 1954 had risen to 1,870,000 tons last year. The memorandum concluded that it was obvious that world production and consumption of natural was remaining fairly static while production and consumption of synthetic was going up.

Japan

Reports that the Japanese have been dissatisfied with inferior quality rubber shipped from Malaya have somewhat surprised rubber traders here, for it is not thought that any complaints have been made to the Rubber Export Registration Board. Reports from Japan suggested that that country was considering diverting its rubber purchases from Malaya to other countries.

The general feeling appeared to be that with Japan's purchases running at the rate of about 100,000 tons a year it would not be a matter of great concern if some of her importers did purchase their rubber elsewhere. Traders have also noted that complaints about

the quality of rubber frequently occur when the price of rubber rises.

The 1958 annual report of the Malayan Rubber Export Registration Board claims that not very many complaints were received. The complaints during the year amounted to .34% of the total shipments which compares with a figure for 1957 of .24%.

Discounting 17 complaints which were 'carried over' from 1957, the actual number of complaints received last year was 123. Action was taken on 13 of these complaints and in two cases fines were imposed amounting to $4,450.

In its report the board says that it is making every effort to improve the grading of rubber shipped for export and it feels sure that when sufficient supplies of type samples are available for distribution to all registered packers and shippers this will result in an improvement in grading.

The board made available during the year for inspection by registered packers and shippers of rubber for export, three complete ranges of type samples of the grades of rubber in the board's offices in Singapore and Kuala Lumpur and in Penang.

The report says, 'It is felt that with these type samples now available packers and shippers should be able to become fully conversant with the types and grades of rubber that are internationally in use.'

Natural v. Synthetic

Before he left Malaya on retirement, Mr S. J. Nias, the general manager of Kepong Rubber Plantations, who is to become a director of the company at its headquarters in London, spoke of the danger of natural rubber remaining too long at a price which invited competition from synthetic.

At a price of 85 cents (Malayan) synthetic could be produced at an abundant rate, he said, and it was necessary if natural was to survive synthetic competition for it to be produced at an economic price. He felt that on a well run estate the cost of production should not exceed 65 cents (Malayan) a lb. However, the cost of estate production was high because of high wages which was now making it uneconomic to have estates of about 1,000 acres. Administrative costs could be kept at a low level with an estate of 4,000 acres which he considered to be the minimum size.

Mr Nias, who has been 35 years in the plantation industry, has nevertheless confidence in a 'great future' for Malayan rubber. Foam rubber especially had a good future in his opinion and he felt that there was a considerable amount of work to be done on latex research. On a recent visit to Japan, he said, manufacturers had told him that they could use twice as much as at present provided that it could be made available to their specifications and at a moderate price.

Although there has been no official notification, newspaper reports here have suggested that when Sir Geoffrey Clay, the head of the Malayan rubber industry's research and development programmes, returns from studying rubber developments abroad he may suggest a 10-year plan for research and development in the natural rubber industry costing about $150 million. This will be rather more than at present contemplated, which is a programme of about $10 millions a year. It is generally expected that on his return Sir Geoffrey will suggest a quickening of the pace in research.

The good and the bad of high-priced rubber to the natural rubber industry here has been noted by the Ministry of Labour in its monthly report. It found that high prices had increased the earnings of tappers, particularly those on smallholdings, but discouraged the manufacturers of rubber goods from buying with the result that some under-employment had resulted. 'For obvious economic reasons it also had the unfortunate effect of delaying rubber replanting in some cases,' says the report. 'On the other hand some of the smaller estates which were hitherto found to be uneconomic have been reopened for tapping.'

There is not normally a great deal of wind in Malaya indeed seldom anything more than an occasional gusty breeze, and the report by the Rubber Research Institute that several planting schemes have been abandoned because of damage by wind will come as something of a surprise. In its monthly magazine, 'Planters' Bulletin,' it states that the catastrophic loss of entire replantings has occurred in a few instances and that heavier damage than had been expected had been widespread. The windiness has been found to increase near the coast and on high ground while the lowland districts are relatively calm. The magazine recommends the pruning of trees and a continuous canopy of trees in a planting system instead of crowding which causes spindly growth.

Purchases of rubber by India from Malaya are on the increase with the rapid development of the motor car assembly and tyre industry in that country. The first Secretary (Commercial) of the Indian Commissioner in Singapore, Mr G. J. Malik, has pointed out that last year India purchased 9,794 tons of rubber from Malaya and in the first five months of this year 5,279 tons. He said that in the last three years India had also increased her production of rubber sheet which were exported to Britain and Russia.

PLASTICS IN CANADA

One of the latest applications of plastics in heavy industry in Canada is a glass fibre/polyester fumes stack 3ft. in diameter, towering 100ft. over the Canada Packers Ltd., fertiliser processing plant in Toronto. The stack is the product of Protective Plastics Ltd., Toronto, formed only five years ago by Paul Szasz and Robert Yeates. The stack is the firm's biggest product yet.

Items in which Protective Plastics have made headway include storage tanks for a British Columbia paper mill, 6ft. in diameter by 12ft. long. They are made from translucent glass fibre/polyester to provide easy liquid level inspection.

Mr E. L. Dawson, for the last fifteen years research manager to Turner Brothers Asbestos Co. Ltd. (branch of Turner and Newall Ltd.), Rochdale and Hindley Green, retired on October 31 1959.

Some of the members of the Plastics Institute party which spent four days in Dusseldorf

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Rubber Statistics

WORLD POSITION AT THE END OF AUGUST

THE Secretariat of the International Rubber Study Group has now issued preliminary details of the world rubber position up to the end of August last. The table which follows shows the natural rubber production and consumption totals for the first eight months of the year (in 1,000 long tons):

NATURAL RUBBER

	August 1959	Jan.-August 1959	Jan.-August 1958
Production ..	175.0	1,335.0	1,247.5
Consumption ..	145.0	1,377.5	1,255.0
		Change since Jan. 1 1959	
Stocks at August 31:			
In producing areas ..		260.0	−32.5
In consuming areas ..		207.5	−10.0
Afloat		222.5	− 2.5
		690.0	−45.0

Synthetic Rubber

The synthetic rubber production and consumption position is set out in the following table:

SYNTHETIC RUBBER

	August 1959	Jan.-August 1959	Jan.-August 1958
Production ..	135.0	960.0	755.0
Consumption ..	122.5	985.0	785.0
		Change since Jan. 1 1959	
Stocks at August 31 ..		260.0	+2.5

US General Position

The United States Department of Commerce has issued the following preliminary statistics for the month of August (in long tons):

NATURAL RUBBER

Consumption:
46,914 tons, of which latex 6,613 tons.
Stocks:
80,106 tons, of which latex 11,472 tons.

SYNTHETIC RUBBER

	Production	Consumption	Stocks
S-Type ..	97,113	75,340	148,795
Butyl ..	8,050	5,533	10,558
Neoprene ..	10,471	7,117	15,745
N-Type ..	3,397	3,047	8,418
	119,031	91,037	183,516

Total new rubber consumption during August amounted to 137,951 tons compared with a total of 141,279 tons during July, with natural rubber accounting for 34.01% as compared with 33.65%. Total consumption to the end of August amounted to 1,074,692 tons, an increase of some 27% compared with the comparable 1958 total of 846,968 tons.

Cambodia

The International Rubber Study Group has recently made available details of Cambodia's rubber exports up to the end of August. During this period, exports totalled 19,514 tons and included 4,799 tons of latex. The greater part of these exports, totalling 15,171 tons or nearly 80%, went to the USA. Of the remainder, France took 2,730 tons, while smaller quantities went to Singapore, Western Germany and Japan. Of the latex included in these figures, 2,568 tons went to the USA, 2,175 tons to France and 56 tons to Western Germany.

Italy

Provisional details are now available of Italian rubber consumption during the first half of the year; these figures are expressed in metric tons.

The total amounts of rubber used were: natural rubber 25,885 tons, synthetic rubber 12,469 tons, and reclaimed rubber 4,395 tons. Of the natural rubber, latex accounted for 4,563 tons and smoked sheets for 13,480 tons. Tyres and tubes took 16,023 tons, technical and other articles 8,013 tons, and footwear 1,106 tons.

The synthetic rubber used included 9,024 tons of S-type, of which 335 tons were in the form of latex, and in addition 1,250 tons of neoprene, 1,764 tons of butyl and 421 tons of N-type synthetic. Of the synthetic total 8,674 tons went into tyres and tubes and 1,825 tons into technical and other articles while 1,612 tons were used for cables. In the case of reclaim 2,133 tons were used for tyres and tubes and 1,951 tons for technical products.

COMPANIES in the NEWS

Leyland and Birmingham Rubber Co. Ltd.

Group profits after taxation of the Leyland and Birmingham Rubber Co. Ltd., Leyland, Lancs., totalled £350,256 which compares with £403,285 in the previous year. A final dividend of 10% is recommended. Taxation for the year totalled £282,397 (£302,598). Current liabilities total £281,678 (£324,455).

Highlands and Lowlands Para Rubber Co. Ltd.

It has been decided by the directors of Highlands and Lowlands Para Rubber Co. Ltd. that the capitalization issue of 1 for 5 will be made to stockholders on the register at the close of business on November 20 1959. This date is substituted for October 19 1959 as previously announced. Subject to the necessary resolutions being passed at the extraordinary general meeting to be held on December 9 1959, Renounceable Allotment Letters will be posted to stockholders on December 10 1959.

Rubber Crop Returns

Unless otherwise indicated the figures quoted, to the nearest thousand lb., represent crop returns for the month stated and for the number of months of the planting company's financial year to date. Corresponding figures are given in parentheses.

RUBBER ESTATE AGENCY

August

Bandar Sumatra.—96 (82). 2 mths—191 (168).
Batu Kawan.—64 (60). 1 mth—54 (60).
Buntar.—115 (97). 3 mths—362 (280).
Eastern Sumatra.—360 (368). 7 mths—2,186 (2,154).
Amalgamated Rubber.—11 (10). 9 mths—279 (287).
Java Rubber Plantations.—39 (46). 9 mths—691 (718).
Jeram.—309 (207). 6 mths—1,921 (1,200).
Kepitigalla.—56 (66). 6 mths—320 (349).
Kuala Lumpur.—656 (595). 3 mths—2,019 (1,835).
Langkat Sumatra.—81 (81). 9 mths—659 (652).
Soember Ajoe.—4 (13). 12 mths—290 (330).
Sungei Bahru.—132 (105). 3 mths—383 (307).
Sungei Kahang.—161 (145). 7 mths—1,084 (997).
Tambira.—116 (119). 3 mths—332 (357).
Tamiang (Malaya).—80 (73). 12 mths—885 (739).
Tanjong Malim.—374 (329). 3 mths—1,152 (978).
Sennah.—145 (121). 9 mths—1,290 (1,217).

THOMAS BARLOW AND BROS.

September

Bradwall (FMS).—158. 9 mths—1,172 (1,266).
Chersonese (FMS).—72. 9 mths—548 (497).
Highlands and Lowlands Para (including Scottish Malayan).—1,966. 9 mths—16,864 (15,264).
Klabang.—110. 9 mths—820 (742).
Krian.—12. 9 mths—83 (130).
Muar River.—108. 9 mths—944 (1,095).
Sungei Krian.—167. 9 mths—1,383 (1,420).
Manchester North Borneo.—56. 6 mths—433 (383).

September

Sedenak.—186 (211). 12 mths—2,471 (2,141).
Mengkibol.—100 (82). 9 mths—772 (679).
Kemasul.—40 (44). 8 mths—358 (372).
Inch Kenneth Kajang.—182 (174). 9 mths—1,483 (1,483).
Elpitiya.—12 mths to September—1,220 (1,168).
Kuala Reman.—162.

I.C.I. Heavy Organic Chemicals

Price Reductions

The Heavy Organic Chemicals Division of I.C.I. Ltd. has announced a reduction in all prices of normal butyl alcohol (*n*-butanol). For example, the price for a 10-ton tanker load is reduced by £12 per ton to £130 per ton. This price reduction is made possible by the recent additions at Billingham, Co. Durham, to I.C.I.'s carbonylation capacity, now well over 60,000 tons/year, which includes increased *n*-butanol production capacity.

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Factice	white, also for hot vulcanization — yellow, for light coloured compounds — brown, for general use
Antidust 1060	Liquid separating agent for uncured stock and extrusions
Additive Pastes 1100 and 1600	Additives for blown compounds — improve the cell structure — remove odour — disperse and activate white fillers
Dispersions	for coating, combining and doubling of fabrics — for the production of adhesives and — for backing tufted carpets
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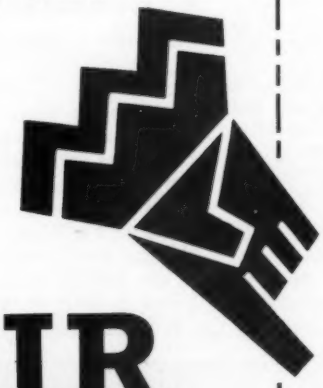

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PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Rubber Compositions

No. 813,115. United Aircraft Corporation. Application and Filed, May 11 1955. Application in USA, May 17 1954. Published, May 6 1959.

The resistance of natural and synthetic rubbers to ozone is increased by incorporating polyvinyl butyral in the rubber in a proportion of 30-60 parts per 100 parts of rubber. The mixtures of polyvinyl butyral and rubber are vulcanized in the usual way. One particular application of such rubber compositions is for cover stocks for fairings of airplane propellers. Examples are given of compositions of natural rubber, SBR and nitrile rubber containing polyvinyl butyral.

Ethylene Polymerization

No. 814,665. Imperial Chemical Industries Ltd. Inventor: L. Seed. Application, February 22 1956. Filed, January 28 1957. Published, June 10 1959.

Solid, stiff, tough polymers of ethylene having densities greater than 0.925 gm./cc. are made by polymerizing gaseous ethylene at a temperature below 150°C. and at a pressure above 500 atmospheres in the presence of an azo catalyst and, as a chain-transfer agent, 0.01 to 5.0% of hydrogen, carbon tetrachloride or chloroform, or a mixture of these agents. Azoesters and azonitriles are very suitable catalysts, examples being the alkyl esters of azo di-isobutyric acid and the azonitriles derived from butyric and valeric acids.

Simultaneous Extrusion and Foaming of Plastic Materials

No. 812,798. E. I. du Pont de Nemours and Co. Application and Filed, January 16 1956. Application in USA, August 31 1955. Published, April 29 1959.

Plastic material is converted into a foam by dissolving a gas, such as nitrogen, in the plastic material at an elevated temperature while it is being advanced through an extruder barrel by means of a rotating extrusion screw. The extrusion screw has a zone (*A*) of lesser root diameter than the adjacent zones, as described in Specification No. 783,723, the gas being injected into the extruder at zone *A*. In an example, a foamed rod of polythene was made by the process.

Shorter Abstracts

PVC Conveyor Belting. 812,458. The Goodyear Tire and Rubber Co. Filed, August 20 1957.—Laminated PVC belting has an inner layer of PVC composition of electrical conductivity considerably greater than that of the outer layers.

Antioxidant. 812,467. Imperial Chemical Industries, Ltd. Filed, November 6 1957.—The compound 4 - sec - butylamino - diphenylamine is claimed as an antioxidant and anti-flex-cracking agent for natural and synthetic rubbers.

Moplen Packaging Award

Moplen polypropylene, made by the Montecatini Company, was awarded the 'Eurostar' packaging award as the most outstanding new material for packaging purposes at the recent International Packaging Exposition at Olympia, London. The award is given annually by the European Packaging Federation. Moplen was awarded the 'Oscar' of the Italian Packaging Institute of Padua in June of this year.

The floors and ramps of this multi-floor garage in the United States have been coated with a special rubber sealant — 'Rub-R-Road' Compound R 526 — manufactured by the Firestone Company in America. With good qualities of resistance to oil and abrasion, etc., the compound is here being applied with a squeegee

British Standards

Testing Vulcanized Rubber

Use of a micro-instrument, for the testing of smaller and thinner test pieces of vulcanized rubber, is the feature which distinguishes Part A20 (determination of hardness) of the revised BS 903 from the standard hardness test specified in Part A7 of the same standard. The micro-hardness test—applicable to samples down to 1mm. thickness—is, a 'scaled-down' version of the test in Part A7. Following an explanatory note, separate sections of the new publication deal with: test piece, apparatus, procedure, temperature of test and form of report.

The standard concludes with a table for the determination of hardness in British Standard and International Rubber Hardness degrees for instruments calibrated in millimetres. Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1. Price 3s.

Latex Foam Rubber Components for Furniture

Application of a new British Standard, BS 3129: 1959, 'Latex Foam Rubber Components for Furniture,' will ensure a high quality product without restricting manufacturers to any particular compound, process or design. Components made in accordance with it will be suitable for incorporation in furniture complying with BS 1960, Part 5: 'Domestic Furniture.' Requirements are specified for materials, construction and general condition; and two tables set out tolerances on length, width and thickness. Additionally, limits are specified for various properties of the product. Amplifying the test requirements in the 12-page publication are appendices dealing with 'Indentation hardness,' 'Indentation set' and the 'Pounding test.' (This specification does not apply to articles made from shredded latex or to those consisting of a cover enclosing loose pieces of latex foam rubber.) Copies of this Standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1. Price 4s.

New Scientific Journal

A new journal to promote the science of large molecules—'Polymer'—has been founded by Butterworths Publications Ltd. to provide an international medium for the publication of original papers on the chemistry, physics and application of polymer research. The advisory editorial board of 'Polymer' consists of: Dr C. H. Bamford, Courtaulds Ltd., Research Laboratory, Maidenhead; Professor C. E. H. Bawn, University of Liverpool; Professor Geoffrey Gee, University of Manchester; and Dr Rowland Hill, research director, I.C.I. Fibres Division, Harrogate. 'Polymer' will appear quarterly from January 1960, about 500 pages, and priced £5 per volume.

Rubber Markets

LONDON

Generally quiet conditions have prevailed in the London rubber market during the past week and prices have fluctuated rather widely, reflecting movements in the East. Nearby positions are still a nominal market as a result of the severe shortage of current supplies of rubber but the nominal quotations are lower with Spot 1¼d. down at 35¾d. nominal per lb. By contrast distant positions are higher although gains are limited to ⅜d.

Latest prices are as follows:

No. 1 RSS Spot: 35¾d.

Settlement House:

December 34¼d. nominal.

January/March 33¾d.-33⅜d.

April/June 31½d.-31¾d.

July/September 30⅜d.-30⅝d.

October/December 30d.-30¼d.

No. 1 RSS cif basis ports:

November 35¾d. nominal.

December 34¼d.-34½d.

Godown:

November 129 Straits cents nominal.

Latex

Centrifuged latex per gallon in drums, December shipment 22s. 9d., January, 22s. 6d., cif European ports. Spot, 23s. 3d., nominal 23s. 6d. Bulk, not quoted. Creamed, seller, December, 22s. Normal, seller, 16s. 3d.

AMSTERDAM

The Amsterdam rubber market ruled as follows on November 9:

	Guilders per kilo	
No. 1 RMA	Nov. 9	Previous
November	3.30½	3.30½
December	3.20½	3.20½
January	3.07	3.07
February	3.07	3.07
March	3.07	3.07
January/March ..	3.07	3.07

Sales: 30 Tendency: Quiet

BANGKOK

No. 1 RSS

The price of No. 1 RSS at Bangkok on November 9 was 35.62½ (35.87½) US cents per lb.

SINGAPORE

Prices were marked up at the outset on November 9, and steadied further on a quiet market. Sellers were reserved. At the narrower differential there was renewed interest in the November position. Lower sheet interest was small and factories were quiet. The afternoon was quiet despite a rise in prices due to reports of resumption of work in United States steel mills. Sellers were reserved and the turnover was small. The market finished on a quietly steady note.

	Straits cents per lb. fob Malayan ports to open ports	
	Close	Previous Close
No. 1 RSS, Nov. ..	124½–124⅝	120⅞–121¼
Dec. ..	114⅞–115½	112 –112¼
No. 2 RSS, Nov. ..	120¼–121¼	116½–118
No. 3 RSS, Nov. ..	117½–118½	114 –115
No. 4 RSS, Nov. ..	114 –116	111½–112½
No. 5 RSS, Nov. ..	111 –113	108½–109½
No. 1 RSS, Spot ..	126 –128	123½–124½
No. 3 blanket, thick remilled, Nov. ..	111½–113½	107½–109½
No. 1 fine pale crepe, Nov.	130 –132	127½–129½
Thin brown crepe, Nov.	113 –114	107½–109½

Tendency: Quietly steady

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums fob at 224.00d. per gallon.

CEYLON

No. 1 RSS

The price of No. 1 RSS spot at Colombo on November 9 was 156 (closed) Ceylon cents per lb.

NEW YORK

The New York rubber market ruled as follows on November 9:

Dealers' Prices

	US cents/lb., ex-dock	
	Nov. 9	Previous
No. 1 RSS, Nov. ..	43⅛n	43⅛n
Dec. ..	41⅛t	40⅛n
No. 2 RSS, Nov. ..	43⅛n	43n
Dec. ..	41n	40n
No. 3 RSS, Nov. ..	43n	42⅜n
Dec. ..	40⅜n	39⅜n
No. 1 RSS, Spot ..	45n	45n
No. 3 Amber blanket, crepe, Jan. ..	38b–38¼a	37⅜n
No. 1 Latex, thin crepe, Nov. ..	41⅜n	41⅛n
No. 1 latex, thick crepe, Nov. ..	unquoted	

Futures—Rex Contract

	US cents per lb.	
	Close	Prev. Close
Nov. ..	44.25b–44.50a	44.00b–44.55a
Jan. ..	39.25t	38.45t
March ..	37.35t	36.75b–36.85a
May ..	36.51t	35.80b–35.90a
July ..	35.60b–35.75a	35.20b–35.40a
Sept. ..	35.30b–35.50a	34.90b–35.10a
Nov. ..	35.00b–35.20a	34.60b–34.80a

Sales: 56 Tendency: Firm

Rubber futures were firmer on November 9 on light covering and new buying reflecting higher foreign markets. Trading was on a moderate scale. Physical rubber was very steady but quiet. Factories showed only routine interest. Futures remained firm on covering later in the day. Physicals were more active and the undertone was firm.

DJAKARTA

The market was very quiet on November 9. Only small transactions took place including 10 tons of sheet No. 1 for ready delivery at 44.00 rupiahs.

	Rupiahs per kilo	
	Nov. 9	Previous
Spot No. 1 Priok ..	43.25b	43.00b
Spot No. 2 Priok ..	42.25b	42.00b
Spot No. 3 Priok ..	41.25b	41.00b
No. 1 fine pale crepe, spot	42.00b	42.00b

Tendency: Very quiet

New Latex Gives High-Gloss Coating

A new butadiene copolymer latex, known as BC.1, is being developed by I.C.I. Plastics Division. It is of particular interest to converters producing high-gloss coatings over printed paper and board, for example, postcards, book covers and record sleeves.

It has been common practice for some years to manufacture such products by using lacquers or by laminating with plastic foils like PVC and cellulose acetate. The function of the top coating is both decorative and protective.

With the new latex, BC.1, the printed paper or board is coated with the latex and then glazed by pressing between polished platens at 120°C. and ½-¾ tons/sq. in. pressure. Coating can be carried out by spraying, rolling or air knife application.

The process enables thinner films to be applied and the adhesion between the plastic and the paper is much improved compared with the foil/paper laminates. BC.1, being an aqueous dispersion, also avoids the solvent hazards associated with lacquers.

Goodyear Dividend

A three-for-one stock split plus a 12½% increase in the cash dividend on the common and a 2% stock dividend on the split shares were authorized by directors of Goodyear Tire and Rubber Company on November 4.

The Antwerp permanent centre for building materials display (Centre National du Batiment, 191 avenue Jan van Rijswijck) announces that it is prepared to arrange the showing of 16mm. films on UK building methods. Manufacturers interested should write directly to the above address.

Industry INTELLIGENCE

Technical Data

Colargile Rubber Fillers

The Colargile series of rubber fillers are activated crystalline clays of French manufacture. They have found favour with rubber manufacturers on the Continent for many years and have now been introduced into the UK, being available from the British Recovered Rubber and Chemical Co. Ltd., Ashton New Road, Manchester 11, distributors and stockists in the British Isles and from Gordon and Martin Ltd., Manchester 1, exclusive agents for the British Isles and the British Commonwealth. There are eight grades, brief particulars of which are as follows: Colargile C—For use in rubber soles, heels, boots, etc. Colargile CR—An excellent reinforcing grade. Colargiles CX and CRX—These grades have the finest particle size and are recommended for use in extrusions, including natural rubber and Neoprene cable compounds. Colargiles CG and CRG—Darker grades, mainly used in black or dark rubber compounds. Colargiles CB and CRB—Very light in colour and used in white or light-coloured rubber goods.

A technical bulletin containing results of an investigation of three grades of Colargile in rubber and other information on these reinforcing fillers has been issued by the British distributors. Colargiles CRB, CRX and CRG were used in this investigation, another reinforcing clay and SRF black being included for comparison. Two series of mixes were used, one series containing 25 volumes of filler phr and the other series containing 50 volumes of filler phr. Natural rubber (smoked sheet) was used in all the compounds and these were vulcanized at 143°C. Optimum cure with the 25-volume loading was 11 minutes for the Colargiles and 15 minutes for the other reinforcing clay and the SRF black, while with the 50-volume loading, the optimum cure remained at 11 minutes for the Colargiles but increased to 20 minutes for the other reinforcing clay, the time for the SRF black remaining at 15 minutes.

Data are given for the following properties of the vulcanizates: Tensile strength, elongation at break, modulus, hardness, tear strength, permanent set, abrasion resistance and resilience. At both filler loadings, the tensile strength and tear strength of Colargiles CRX and CRG were distinctly higher than these properties for the other reinforcing clay. Tensile strength of CRX and CRG was equal to, and tear strength lower than that of SRF black at the 25-volume loading, both these properties of CRX and CRG being higher than those of the SRF black at the 50-volume loading. In the case of Colargile CRB, tensile strength and tear strength are lower than for CRX and CRG but are still higher than for the other reinforcing clay. Colargile CRB, being white, effects an economy over more expensive white pigments in white and light-coloured compounds. This grade is recommended for use in direct vulcanization soling compounds as it produces an easy-flowing unvulcanized stock with good adhesion properties. It is suitable also for microcellular and blown sponge compounds. Colargiles can be used satisfactorily in combination with all the usual rubber fillers and if used with other cheaper fillers in low-cost compounds, they will improve the physical properties of the vulcanized product.

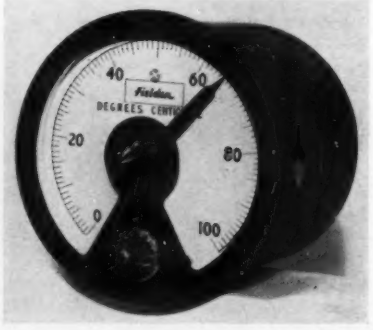
Machines, Materials and Equipment

Fibre Cutter

A cutter for nylon or other synthetic fibre materials is being manufactured by David Griffin Ltd., Wimborne Road, Poole, Dorset. It is constructed in a similar way to an instrument soldering iron, being provided with a heated stainless steel cutting blade. The cutter is held like a pen and used with a light pressure. The heated bit seals the cut edges and prevents fraying, and it is claimed that hems are thus rendered unnecessary. The instrument consumes 30 watts on a normal mains supply.

Transistorized Temperature Controller

The first of the new Fielden 'Bikini' range of transistorized instruments has just been released. This is a precision temperature controller with a differential of only 0.5°C., high



calibration accuracy and very high long term stability. The instrument is housed in a small meter type case and occupies a panel space of only 4½in. diameter. The scale, which is 9in. long, is calibrated directly in °C. or °F. and the bold pointer is set to the required control temperature by a small knob in the centre of the instrument. A red lamp visible from the sides as well as from the front indicates the control action. The meter type case is completely sealed and contains no galvos, pivots or other delicate moving parts and the instrument can be mounted at any angle, for example, on a sloping control desk. Control can be at any temperature between −200°C. and +500°C. with a minimum temperature range span of 50°C. and there are 12 standard calibrations in °C. and °F. A platinum resistance element is used at the temperature measuring point, this being housed in a robust stainless steel sheath of ¼in. diameter. Ordinary connecting cable is used between the measuring point and the instrument and this can be up to 300ft. in length without introducing errors. The control action is on/off, either electrical or pneumatic. The electrical contacts give changeover switching at 5 amperes 250 volts, whilst the peumatic valve requires 17 to 20 psi input. An interesting feature is that the electrical or pneumatic control relay can be located up to 300ft. away from the instrument itself and only simple light duty cabling is required between the instrument and the electrical or pneumatic relay. The manufacturers are Fielden Electronics Ltd., Paston Road, Wythenshawe, Manchester 22.

Publications Received

Reagents for Research

L. Light and Co. Ltd., of Colnbrook, Bucks., have just issued their 1960 catalogue of over 5,000 substances which embrace organic chemicals for syntheses, biochemicals, enzymes and analytical reagents. Since their 1958 list the range has been increased by 1,000 items. Particular emphasis has been placed on the manufacture of chromatographically pure laevo-amino acids and peptides. Rare alkaloids and phytochemicals have also been included. A specialized laboratory is now being equipped to produce crystalline enzymes such as ribonuclease, chymotrypsin, trypsin, peroxidase and deoxyribonuclease on a pilot scale. Multipurpose, all-glass 100 litre pilot plant has been erected to cope with the demand for custom syntheses. The research laboratory has been measuring the IR and UV absorption spectra of many new substances and will shortly be able to record the optical rotatory dispersion curve in the visible region. These services are available to clients on an hourly basis. The company also offers a range of Ultra Pure (99.999%) elements such as gallium, antimony, arsenic and phosphorus. They also supply very pure inorganic salts such as cesium iodide and metal fluorides for growing single crystals for the optical industry.

Future Events

INSTITUTION OF THE RUBBER INDUSTRY

Manchester Section.—Monday November 23 at the Engineers Club, Manchester, at 6.45 p.m. 'Developments in Flame and Ozone Resistant Compounds' by L. Bustos, B.Sc., G. Gornil, A.F.I.C., W. A. Tandy, L.I.R.I., and J. Walker (Polymer (UK) Ltd.).

PLASTICS INSTITUTE

The conference on 'The Influence of Plastics in Building,' will be held at the Royal Institute of British Architects, 66 Portland Place, London, W.1, on Thursday and Friday, November 19 and 20.

World Rubber

The International Rubber Study Group, in the October issue of its Rubber Statistical Bulletin, has revised several figures for June, July and August. The figure for total stocks at the end of June has been revised to 672,500 long tons; stocks in consuming areas to 205,000 long tons; and synthetic rubber consumption to 132,500 long tons.

World production of natural rubber in July has been amended to 177,500 long tons; total stocks at the end of July to 677,500 long tons, stocks afloat to 220,000 long tons and synthetic rubber production to 126,733 long tons. The figure for August exports from Indonesia has been revised to 60,402 long tons.

Rodform Tellurac

R. W. Greeff and Co. Ltd. announce that, owing to increased demand, they have been able to reduce the price of Rodform Tellurac. Until further notice the price is 16s. per lb. carriage paid customer's works in the UK, packing free.

Export Opportunities

Erasers for New Zealand

The Director-General (Stores Division), General Post Office, Wellington, New Zealand, has issued the following requirements: 70 gross erasers, medium, 1in. long x 3/10in. diameter, for use on 'Ariel' improved erasing machines. (A sample of the eraser it is proposed to supply must accompany the quotation.)

Closing date for tenders is December 11 1959.

B.o.T. reference: ESB/26067/59.

Plastics Goods for Jamaica

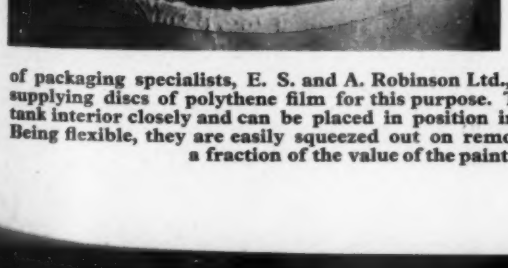
The Board of Trade have been advised by the UK Trade Commissioner at Kingston, Jamaica, that Mr George H. Groves, representative of Carissa Agencies, 47-53 Peters Lane, Kingston, will arrive in the UK early in November for a stay of three to four weeks.

The main object of his visit is to establish connexions with manufacturers of a wide range of goods including plastics goods (utensils, handbags, belts, etc.).

Manufacturers interested in this agency enquiry should write to Mr Groves, c/o Goode, Durrant and Murray Ltd., Durrant House, Chiswell Street, London, E.C.1, and copy their initial correspondence to Room 728, Export Services Branch, Board of Trade, Lacon House, Theobalds Road, London, W.C.1. B.o.T. reference ESB/26110/59.

The address of the Export Services Branch of the Board of Trade is Lacon House, Theobalds Road, London, W.C.1. Telephone number: Chancery 4411, extensions 776 or 866.

Harold B. Wright has been appointed sales manager of Royalite plastics manufactured by United States Rubber Co., with headquarters at the Chicago, Ill. plant.



PAINT COVER

As much as half a gallon of paint can be wasted each time skin forms on the surface of the contents of change-cans or tanks during production. Removal of the skin and associated dust is a troublesome operation and, once formed, it is almost impossible to remove all traces. After trying various devices, including floated solvents and metal covers, paint manufacturers, Alexander, Fergusson and Co. Ltd. of Glasgow, called in a firm of packaging specialists, E. S. and A. Robinson Ltd., of Bristol, who are now supplying discs of polythene film for this purpose. These are made to fit the tank interior closely and can be placed in position in a matter of seconds. Being flexible, they are easily squeezed out on removal and the cost is only a fraction of the value of the paint saved

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

METHOCEL (779,107) For methyl cellulose and mixed cellulose ethers having methyl groups. By The Dow Chemical Co., City of Midland, State of Michigan, USA. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5 to 9 Quality Court, Chancery Lane, London, W.C.2. To be associated with No. 655,040 (3707, 352). (Class 1; September 16 1959.)

LUSTREX (759,532) For synthetic resin plastics having a base of polystyrene, being goods in powder form for use in manufacturing processes by moulding, casting or extrusion. By the Monsanto Chemical Co., 1700 South Second Street, City of St. Louis, State of Missouri, USA. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5 to 9 Quality Court, Chancery Lane, London, W.C.2. To be associated with No. B664,067 (3741, 1138) and another. (Class 1; September 16 1959.)

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on July 29 1959

O. Lundin. Process for producing perforated or contoured plastic sheets. 818,348.

Esso Research and Engineering Co. Method for preparing butyl rubber emulsions. 818,109.

Dow Chemical Co. Formed articles comprising expanded thermoplastic resinous materials and method for their formation. 817,981.

Henkel and Cie. G.m.b.H. Process for the preparation of surface-active polyesters. 818,334.

Montecatini Soc. Generale per l'Industria Mineraria e Chimica. Elastomers having improved elastic characteristics obtained from linear amorphous polymer alpha-olefins higher than propylene. 818,287.

Esso Research and Engineering Co. Butyl white or light coloured vulcanizates. 818,119.

Heberlein and Co. A.G. Treatment of polyester textile fabrics. 818,121.

NEW COMPANIES

Bradley and Turton (Injection) Ltd. (630,825).—June. Capital: £2,000 in £1 shares. To carry on the business of manufacturers of injection moulding machines for use in the manufacture of plastics, etc. The directors are: Nevill P. O. Bradley, Clyndon House, Stourton, near Stourbridge; Henry N. Ewer, 'Kingfishers,' Lymington, Hants.; Horace Pessol and Leonard Shibko. Regd. office: Caldwall Works, Kidderminster.

Gledhill Resin Products Ltd. (630,153).—June 11. Capital: £3,000 in 1,000 ordinary and 2,000 6% cumulative preference shares of £1. To carry on the business of manufacturers of all classes of goods made wholly or partially from fibre glass, resin products, plastic materials and substances; general engineers, coverers and insulators, etc. The directors are: William H. Gledhill, 4 Liston Street, Dukinfield, sheet metal worker, and Alan Powell. Regd. office: 9 Bennett Street, Stalybridge, Cheshire.

PMD Chemicals Ltd. (630,103).—June 10. Capital: £500 in £1 shares. To carry on the business of chemical, electronic, electrical, mechanical and ventilation engineers, rubber and plastic fabricators, manufacturers of and dealers in chemicals, etc. The directors are: Cedric R. Johnson, Dower House, Lapworth, Warwicks., director of Target Engineering Ltd.; Richard F. Naylor, 40 Dillotford Avenue, Styvechale, Coventry; Edgar F. Marlow and Frank Fisher. Regd. office: Hearsall Lane, Coventry.

Lancasters Plastics (Birmingham) Ltd. (628,506).—May 20. Capital: £20,000 in £1 shares. To acquire the business of manufacturers, moulders of and dealers in insulating and plastic materials, carried on by A. E. Charles as 'Lancasters,' etc. The directors are: Albert E. Charles, permanent, and Doris Charles, both of 71 Bristol Road, Edgbaston, Birmingham, 5. Solicitor: E. Cripwell, 55 Temple Row, Birmingham. Registered office: 127/131 Bristol Street, Birmingham, 5.

Charles Colston Appointment

Charles Colston Ltd. announce that Mr Dann Brewster, formerly on the executive staff of Dorland Advertising Ltd., has been appointed advertising manager for the Colston group of companies. These comprise Charles Colston Ltd.; Tallent (Aycliffe) Ltd. —of which Mr Brewster was sales promotion manager; I.T.S. Rubber Ltd.; Minibrix Ltd. and Premo Rubber Co. Ltd.

Perstorp Campaign

Swedish Perstorp plastic lam... sheets are being extensively adver... by Perstorp Products (Great Bri... Ltd. in the national Press, home... ing magazines, architectural jou... and the building trade's ... Retailers are being provided wi... variety of sales aids, including ... flashing window sign, cards, win... stickers, and a stock of 'Do It Y... self' booklets to be given awa... customers. Retailers may also ob... at no cost to themselves a 15 se... colour film to show in their ne... cinema.

Mr C. Jackson has been appo... to the Board of Sampang (... Rubber Plantations. Mr R. B... man has resigned.

Mr P. B. Forrest has ... appointed works manager of Fa... Preston and Co., Metal Indus... engineering subsidiary. He was ... merly production manager a... Chester works of Brookhirst Ig... which is also in the Metal Indu... Group. Mr D. D. Teasdale, ... accountant of Fawcett Preston ... Co., took over the additional po... secretary to the company fr... August 1.

Rubber Journal and International Plastics **CLASSIFIED ADVERTISEMENTS**

APPOINTMENTS VACANT
6d. a word, Minimum 10/-. Box 2/-.

MANCHESTER EDUCATION COMMITTEE
NEWTON HEATH TECHNICAL COLLEGE

Required a qualified engineer with practical experience in plastics or rubber industry to teach plant and equipment to final City and Guilds and D.P.I. Salary in accordance with the Burnham Further Education Report, 1959, Assistants' Scale Grade 'B,' men £700 x £27 10s.—£1,115. Additions for graduateship and training. Starting salary according to previous teaching and industrial experience.—Forms and particulars (s.a.e.) from the Chief Education Officer, P.O. Box 480, Manchester, 3, returnable by 28th November, 1959. 6th November, 1959. (309)

APPLICATIONS are invited by The Sutcliffe Moulded Rubber Company Limited for the position of works manager. The post carries responsibility for production planning, control and methods development, materials control, and for mixing, calendering, extruding, moulding, and roller-covering plants. Applicants should be 27 to 35 years of age, should preferably have a University degree or a diploma in rubber and plastics technology, and should have experience in factory management, modern production techniques and incentive schemes. Remuneration will be dependent upon qualifications and experience but will not be less than £1,500 p.a., plus pension scheme and other benefits. The company is one of a progressive group and provides excellent prospects.—Applications, which will be treated in confidence, should set out details of age, education, qualifications and experience, and should be addressed to The General Manager, Church Street, Ossett, Yorkshire. (278)

APPOINTMENTS VACANT
(continued)

ASSISTANT to chief chemist required by manufacturers of precision engineering rubber components and high-pressure flexible hose, situated in the Cardiff area. Applicants should be aged 20-25 years, and possess a sound knowledge of compound design and processing of synthetic rubbers in particular, and natural rubber. Applicants must be capable of compounding to specifications and tackling customer service problems with a minimum of supervision. Full details of qualifications, experience, age and present salary should be submitted in strict confidence to the Chief Chemist.—Box 295.

COMPANY specialising in sponge and general moulding require chief chemist to take charge of existing laboratory and staff. Candidates should be aged between 30-40 years and have qualifications not less than A.I.R.I. standards. Salary will be commensurate with qualifications but not less than £1... p.a.—Full details of past employment to Box 299. (29...

FOREMAN required for trimming department of rubber company. In addition to rubber experience, mechanical knowledge would be an advantage. Pension and life assurance scheme. Five-day week.—Apply Andre Rubber Co., L... Kingston By-Pass, Tolworth, Surbiton, Surrey. (...

JUNIOR technologist required by rubber manufacturer in London area. Practical experience will count equal to qualifications for this position which carries a good salary with excellent working conditions.—Apply in writing stating full particulars of past experence, etc., to Box 294. (29...

RUBBER manufacturers (London area) require works chemist to take charge of laboratory. Experience in the manufacturing and processing of resin rubber sheeting for the shoe trade essential. Permanent position. Apply giving full details of previous experience, qualifications, and salary required to Managing Director.—Box 305. (3...